

Vol. No. 164

1926

Agricultural Research Institute, Pusa

STANDARD METHODS OF ANALYSIS OF FERTILIZERS

Edited by

J. SEN, M.A., Ph.D.,

Officiating Imperial Agricultural Chemist.



CALCUTTA : GOVERNMENT OF INDIA
CENTRAL PUBLICATION BRANCH

1926

**Government of India Publications are obtainable from
the Government of India Central Publication Branch,
8, Hastings Street, Calcutta, and from the following Agents :—**

EUROPE.

OFFICE OF THE HIGH COMMISSIONER FOR INDIA,
42, GROSVENOR GARDENS, LONDON, S.W. 1.
And at all Booksellers.

INDIA AND CEYLON.

Provincial Book Depôts :

MADRAS :—Office of the Superintendent, Government Press, Mount Road, Madras.
BOMBAY :—Office of the Superintendent of Government Printing and Stationery, Poona.
SINDH :—Library attached to the Office of the Commissioner in Sind, Karachi.
BENGAL :—Office of the Bengal Secretariat Book Depôt, Writers' Building, Room No. 1, Ground Floor, Calcutta.
UNITED PROVINCES OF AGRA AND OUDH :—Office of the Superintendent of Government Press, United Provinces of Agra and Oudh, Allahabad.
PUNJAB :—Office of the Superintendent Government Printing, Punjab, Lahore.
BURMA :—Office of the Superintendent, Government Printing, Burma, Rangoon.
CENTRAL PROVINCES AND BEHAR :—Office of the Central Provinces Secretariat, Nagpur.
ASSAM :—Office of the Superintendent, Assam Secretariat Press.
BIHAR AND ORISSA :—Office of the Superintendent, Government Printing, Bihar and Orissa, P. O. Cuttack, Bhubaneswar, Patna.
COORG :—Office of the Chief Commissioner of Coorg, Bangalore.
NORTH-WEST FRONTIER PROVINCE :—Office of the Manager, Government Printing and Stationery, Peshawar.

Thacker, Spink & Co., Calcutta and Simla.
W. Newman & Co., Ltd., Calcutta.
R. Cambray & Co., Calcutta.
S. K. Lahiri & Co., Calcutta.
The Indian School Supply Depôt, 309, Bow Bazar Street, Calcutta, and 226, Nawab-pur, Dacca.
Butterworth & Co. (India), Ltd., Calcutta.
Rai M. C. Sarcar Bahadur & Sons, 50-2A, Harrison Road, Calcutta.
The Weldon Library, 17, Park Street, Calcutta.
Standard Literature Company, Limited, Calcutta.
Association Press, Calcutta.
Chukervetty, Chatterjee & Co., Ltd., 13, College Square, Calcutta.
The Book Company, Calcutta.
Hygieneathan & Co., Madras.
V. Kalyanaram Iyer & Co., Madras.
P. R. Rama Iyer & Co., Madras.
Rochouse and Sons, Madras.
Bright & Co., Trivandrum.
The Booklover's Resort Talkad, Trivandrum, South India.
V. S. Swaminathan, Bookseller, West Tower Street, Madras.
Thacker & Co., Ltd., Bombay.
D. B. Taraporevala, Sons & Co., Bombay.
Sunder Pandurang, Bombay.
Ram Chandra Govind & Sons, Kalbadevi, Bombay.
N. M. Tripathi & Co., Booksellers, Princess Street, Kalbadevi Road, Bombay.
Proprietor, New Kitabkhana, Poona.
The Manager, Oriental Book Supplying Agency, 15, Shukrawar, Poona City.
R. S. Gondhalekar's Book Depôt, Publisher and Bookseller, Budhwar Chawk, Poona City.
Managing Director, Co-operative Bookhall, Booksellers and Publishers, Poona City.
The Standard Bookhall, Karachi and Rawalpindi.
The Standard Book Depôt, Lahore, Lucknow, Nainital, Mussorie, Dalhousie and Ambala Cantonment.
Karsandas Narandas & Sons, Surat.
Mangaldas & Sons, Booksellers and Publishers, Bhags Talao, Surat.

Mrs. Radhabhai Atmaram Sagoo, Kallabai Road, Bombay.
A. H. Wheeler & Co., Allahabad, Calcutta and Bombay.
N. R. Mathur, Supdt., Nazir Kanan Hind Press, Allahabad.
The North India Christian Tract and Book Society, 15, Olive Road, Allahabad.
Ram Dayal Agarwala, 184, Katra, Allahabad.
Manager, Newal Kishore Press, Lucknow.
The Upper India Publishing House, Ltd., 41, Aminabad Park, Lucknow.
Munshi Saeta Ram, Managing Proprietor, Indian Army Book Depôt, Juhl, Cawnpore.
Rai Sahib M. Gulab Singh & Sons, Muzdafi Am Press, Lahore and Allahabad.
Rama Krishna & Sons, Booksellers, Anarkali, Lahore.
Puri Brothers, Booksellers and Publishers, Kachhri Road, Lahore.
The Tilak School Book-shop, Lahore.
Manager of the Imperial Book Depôt, 41, Chandni Chawk Street, Delhi.
Oxford Book and Stationery Company, Delhi.
Supdt., American Baptist Mission Press, Rangoon.
Proprietor, Rangoon Times Press, Rangoon.
The Modern Publishing House, Ltd., 30, Phayre Street, Rangoon.
The International Buddhist Book Depôt, Post Box No. 971, Rangoon.
Burma Book Club, Ltd., Rangoon.
Manager, the "Hitavada," Nagpur.
S. C. Talukdar, Proprietor, Students & Co., Cochin Behar.
Times of Ceylon Co., Ltd.
The Manager, Ceylon Observer, Colombo.
The Manager, The Indian Book Shop, Benares City.
B. C. Banerj, Esq., Proprietor, Allen Library, Dacca.
The Srivilliputtur Co-operative Trading Union, Ltd., Srivilliputtur (Sector S.F.R.).
Banwari Lal, Esq., Pakariya Street, Pilibhit, United Provinces.

PREFACE

Reports on the composition of agricultural products at times show relatively wide divergences, even when the analyses are carried out by specialists, unless the same standard methods are adopted. In view of this fact, the First Conference of Agricultural Chemists and Bacteriologists, held at Pusa in 1919, adopted a resolution recognizing the necessity for the standardization of methods of analysis. A Standing Committee was appointed to investigate and report on methods applicable to specific materials. Investigation of each of the fertilizer constituents was distributed to sets of workers chosen from among the members of the Committee, of which Dr. W. H. Harrison, Imperial Agricultural Chemist, was appointed Secretary. It was decided that reports on critical studies of existing methods and of the new methods as they appear were to be transmitted to the Secretary for circulation.

The reports were considered at the Second Conference of Chemists and Bacteriologists which met at Pusa in 1921, when certain methods were accepted as official, while certain others were temporarily adopted as provisional. A Committee was formed to prepare and circulate details of the proposed standard methods for analysis of fertilizers. It was hoped that before the next meeting of the Conference, which was to take place in 1923, it would be possible to thoroughly test these methods in the different Agricultural Chemical Laboratories, and that it would thus be possible to have all the standard methods in shape for final acceptance at the Conference. As unfortunately no Conference of Chemists and Bacteriologists has been held since 1921, the Imperial Agricultural Chemist undertook to circulate the final report to agricultural chemists and other scientists interested in the subject throughout India. All the members of the postponed Conference of 1923 were requested to furnish the Imperial Agricultural Chemist with their opinion or any suggestions they wished to offer. Cordial thanks are due to the members of the Committee most of whom have kindly responded to the request. The consensus of opinion being in favour of publication of these methods, this is now being done, after considering the individual points raised.

In conclusion, it may be pointed out that the methods are largely based on the Official and Tentative Methods of Analysis published in 1920 by the Association of Official Agricultural Chemists of the United States of America. The value of this monumental work of the Association has been universally acknowledged. As, however, the conditions

in India are somewhat different from those prevailing in America, it has been necessary to modify the procedure in certain details. Needless to say, ease of manipulation together with quickness of operation have been taken into consideration along with accuracy of the results obtained.

J. SEN

CONTENTS

	PAGE
SAMPLING	
1 COLLECTION OF GROSS SAMPLE	1
2 SAMPLING FOR ANALYSIS	ib.
3 MECHANICAL ANALYSIS OF BONE MEAL, ROCK PHOSPHATE AND BASIC SLAG	2
4 MOISTURE	ib.
TOTAL PHOSPHORIC ACID	ib.
Gravimetric Method	ib.
5 REAGENTS	ib.
6 PREPARATION OF SOLUTION	3
7 DETERMINATION	4
8 Volumetric Method	ib.
9 REAGENTS	ib.
10 PREPARATION OF SOLUTION	5
11 DETERMINATION	ib.
12 WATER-SOLUBLE PHOSPHORIC ACID	ib.
CITRATE-INSOLUBLE PHOSPHORIC ACID	6
13 PREPARATION OF AMMONIUM CITRATE SOLUTION	ib.
14 DETERMINATION	ib.
15 CITRATE-SOLUBLE PHOSPHORIC ACID	ib.
ORGANIC AND AMMONIACAL NITROGEN ONLY	7
Kjeldahl Method	ib.
16 REAGENTS	ib.
17 DETERMINATION	8
TOTAL NITROGEN	ib.
Kjeldahl Method modified to include the Nitrogen of Nitrates	ib.
18 REAGENTS	9
19 DETERMINATION	ib.
20 AMMONIACAL NITROGEN	ib.
21 NITRIC AND AMMONIACAL NITROGEN	ib.
POTASH	10
Platinum Method	ib.
22 REAGENTS	ib.
23 PREPARATION OF SOLUTION	ib.
24 DETERMINATION	ib.
Perchlorate Method	11
25 REAGENTS	ib.
26 PREPARATION OF SOLUTION	13
27 DETERMINATION	ib.

Standard Methods of Analysis of Fertilizers.

(Received for publication on 10th October, 1925.)

SAMPLING.

1 COLLECTION OF GROSS SAMPLE.

From a heap this is best done by the following procedure. Dig well into the heap from several directions and take spade-fulls at regular distances apart. When sampling has to be done from sacks containing material in a firm state, take complete sections from top to bottom by means of the sampling tool (a cylinder of iron 1 inch in internal diameter, sharpened at one end and having a slit from the bottom to near the top, where a handle is attached). In the case of manures in a powdered condition, lay the sacks on their sides and take out samples with the help of the above-mentioned tool. When sampling oil cake, see that the sample is uniform in appearance. If it is not uniform, collect the sample only after carefully grading it. For this purpose select typical cakes, break them in halves and cut off a section 2 inches wide from the middle of each. Break up the cake sections for further sampling.

2 SAMPLING FOR ANALYSIS.

(a) If the gross sample is moist and cannot be air-dried without danger of loss occurring to some of the ingredients to be determined, rapidly mix and quarter the sample. When necessary, take such special steps as are required to avoid changes of composition. For example, if loss of ammonia is feared, add sulphuric acid to part of the final sample. In such cases always enter in the report a full description of the state of the manure when sampled and the procedure adopted to avoid loss.

(b) If the gross sample is not air-dry and if air-drying will not cause loss of the ingredients to be determined, weigh the gross sample. Air-dry it and reweigh.

Reduce the air-dry gross sample by quartering to an amount sufficient for analytical purposes.* If a mechanical analysis has to be carried out,

* If the analysis is required in evidence before a court of law, the sampling as prescribed must be carried out in the presence of a witness and at this stage three bottles of sample filled, closed and sealed. The bottles are to be distributed as follows:—one to the seller, one to the analyst, one to the Director of Agriculture. The analyst, on receiving such a sample, will, before opening it, examine the label and seal and enter all details regarding these in his sample register.

as in the case of bone meal and rock phosphate, a part should be set aside for this.

Transfer to a sieve having circular openings 1 mm. in diameter. Sift, breaking up the lumps with a rubber pestle. Grind in a mortar the part remaining on the sieve until the particles pass through. Mix well and preserve in a stoppered bottle.

3 MECHANICAL ANALYSIS OF BONE MEAL, ROCK PHOSPHATE AND BASIC SLAG.

Transfer 100 gm. of the material to a sieve having circular holes 0.5 mm. in diameter. Sift, breaking up the lumps with a soft rubber pestle. Weigh the coarse portion remaining on the sieve. Determine the fine portion by difference.

4

MOISTURE.

(a) If the sample cannot be air-dried, special steps should be taken to determine the moisture in the gross sample and in the portions used for analysis.

(b) In the case of air-dry samples, heat 2.5 gm. of the sample in a water oven at the temperature of boiling water for five hours, or more, till the weight is constant. For the determination of moisture in potash salts, sodium nitrate and ammonium sulphate, heat at about 130°C. to constant weight. The loss is considered to be moisture.

TOTAL PHOSPHORIC ACID.

Gravimetric Method.

5

REAGENTS.

(a) *Molybdate reagent.* Dissolve 133 gm. ammonium molybdate in 800 c.c. water. Add an amount of ammonia which is just sufficient to dissolve the slight turbidity. Make up the solution to 1 litre. Dilute 487 c. c. of nitric acid (sp. gr. 1.416) to 1 litre. Just when required, mix equal volumes of ammonium molybdate and nitric acid solutions, always pouring the molybdate solution into the acid. This mixture will be hereafter referred to as molybdate reagent.

(b) *Ammonium nitrate solution.* Dissolve 200 gm. of commercial ammonium nitrate (phosphate-free) in water and dilute to 2 litres.

(c) *Magnesia mixture.* Dissolve 22 gm. of recently ignited calcined magnesia in dilute hydrochloric acid avoiding an excess of acid, add a little calcined magnesia in excess and boil for a few minutes to precipitate iron, aluminium and phosphoric acid. Filter, add 280 gm. of ammonium chloride, and 261 c. c. of ammonium hydrate (sp. gr. 0.90) and dilute to 2 litres. Instead of a solution of 22 gm. calcined magnesia in dilute hydrochloric acid, 110 gm. of crystallized magnesium chloride, $\text{MgCl}_2 \cdot 6\text{H}_2\text{O}$, dissolved in water may be substituted.

(d) *Dilute ammonium hydrate for washing.* Dilute 100 c.c. of ammonium hydrate of 0.90 sp. gr. to 1 litre.

6

PREPARATION OF SOLUTION.

Treat 2 gm. of the sample by one of the methods given below. In the case of (d), 2.5 gm. may be used. Cool the solution, dilute to 200 c. c., or to 250 c. c. if a 2.5 gm. sample was used. Mix and pour on a dry filter.

(a) Ignite and dissolve in hydrochloric acid.

(b) Evaporate with 5 c. c. of magnesium nitrate, ignite and dissolve in hydrochloric acid.

Magnesium nitrate solution. Dissolve 320 gm. of calcined magnesia in nitric acid avoiding an excess of the latter, then add a little calcined magnesia in excess, boil, filter from the excess of magnesia, precipitated ferric oxide, etc., and dilute to 2 litres.

(c) Boil with 20-30 c. c. of strong sulphuric acid in a Kjeldahl flask adding 2-4 gm. of sodium or potassium nitrate at the beginning of the digestion and a small quantity after the solution has become nearly colourless, or adding the nitrate in small portions from time to time. After the solution is colourless, add 150 c. c. of water and boil for a few minutes.

(d) Digest in a Kjeldahl flask with strong sulphuric acid and such other reagents as are used in either the plain or modified Kjeldahl or Gunning method for estimating nitrogen. Do not add potassium permanganate but, after the solution has become colourless, add about 100 c. c. of water and boil for a few minutes.

(e) Dissolve in 30 c. c. of concentrated nitric acid and a small quantity of hydrochloric acid and boil until organic matter is destroyed.

(f) Add 30 c. c. of concentrated hydrochloric acid, heat and add cautiously, in small quantities at a time, about 0.5 gm. of

finely pulverized potassium chlorate to destroy organic matter.

- (g) Dissolve in 15-30 c. c. of strong hydrochloric acid and 3-10 c. c. nitric acid. This method is recommended for fertilizers containing much iron or aluminium phosphate.

7

DETERMINATION.

In case hydrochloric or sulphuric acid has been used as a solvent, add about 15 gm. of dry ammonium nitrate or a solution containing that amount. To the hot solution add 70 c. c. of the molybdate reagent for every decigram of phosphoric acid (P_2O_5) present. Digest at about $65^\circ C$. for an hour, and determine if the phosphoric acid has been completely precipitated, by the addition of more molybdate reagent to the clear supernatant liquid. Filter and wash with ammonium nitrate solution. Dissolve the precipitate on the filter with ammonium hydroxide and hot water and wash into a beaker to a bulk of not more than 100 c. c. Nearly neutralize with hydrochloric acid, cool, and from a burette add slowly (about 1 drop per second) stirring vigorously, 15 c. c. of magnesia mixture for each decigram of phosphoric acid (P_2O_5) present. After 15 minutes add 12 c. c. of ammonium hydroxide (sp. gr. 0.90). Let stand till the supernatant liquid is clear (2 hours are usually enough), filter and wash with the dilute ammonium hydroxide until the washings are practically free from chlorides. Dry, ignite to whiteness or to a greyish white, weigh and calculate to phosphoric acid (P_2O_5).

8

Volumetric method.

A series of tests has been carried out at Pusa, on the strength of which the Committee recommend the following procedure.

9

REAGENTS.

(a) *Molybdate solution.* Shake 200 gm. of powdered ammonium molybdate with about 800 c. c. water in a stoppered cylinder. The salt dissolves at first but the solution soon turns milky. Then cautiously add a solution of ammonia (sp. gr. 0.91) to the molybdate solution till this turns clear. The solution should smell only very faintly of ammonia. Make up volume to 1 litre with distilled water. 1 c. c. of this solution is equivalent to 0.005 gm. phosphoric acid (P_2O_5).

The precipitating molybdate acid mixture is prepared immediately before use, by pouring a quantity of the above ammonium molybdate solution into an equal volume of strong nitric acid (sp. gr. 1.416).

(b) *Standard caustic soda solution.* Use N/7 or N/10 solution.

- (c) *Standard nitric acid solution.* Use N/7 or N/10 solution.
(d) *Potassium nitrate solution.* Prepare a solution containing 3 gm. of potassium nitrate in 100 c. c. of water.
(e) *Phenol-phthalein solution.* Dissolve 1 gm. phenol-phthalein in 100 c. c. of 90 per cent. alcohol.
(f) *Blue litmus paper.*

10

PREPARATION OF SOLUTION.

Proceed as directed under 6.

11

DETERMINATION.

Evaporate an aliquot part of the solution, containing from 5 to 40 mg. phosphoric acid (P_2O_5), down to dryness on the waterbath. Add a few drops of hydrochloric acid and a little water and again evaporate the solution to dryness. Treat the residue with dilute nitric acid and filter. Collect the filtrate and washings in a 100 c. c. beaker, make up to about 50 c. c. and pour 20 c. c. of the freshly prepared molybdic acid mixture into solution. Vigorously stir the contents of the beaker with a glass rod, taking care not to touch the sides. Keep the beaker in a warm place, where the temperature is maintained at about 35°C. Stir the contents at least 4 times, at intervals of about half an hour. At the end of 24 hours, filter off the supernatant liquid through paper contained in a small porcelain Gooch crucible and wash the precipitate 3 times by decantation with dilute nitric acid, using 3 c. c. each time, and passing the decanted liquid through the crucible. Continue the washing with the potassium nitrate solution, till the contents of the beaker are free of acid (as tested by litmus paper). Carefully wash the filter paper and the crucible with the nitrate solution till they are also free of nitric acid. Transfer the paper and the precipitate adhering to the crucible to the beaker with the help of a little distilled water. Add a measured volume of standard caustic soda solution till the phospho-molybdate precipitate is dissolved, and titrate back the excess of alkali with standard nitric acid, using phenol-phthalein as indicator.

Each cubic centimeter of N/7 alkali used = 0.000411 gm. phosphoric acid (P_2O_5).

12

WATER-SOLUBLE PHOSPHORIC ACID.

Place 2 gm. of the sample on a 9 cm. filter. Wash with successive small portions of water, allowing each portion to pass through before adding more, until the filtrate measures nearly 250 c. c. If the filtrate is slightly turbid, clear with a little nitric acid. Make up to 250 c. c. Mix

thoroughly and determine the phosphoric acid (P_2O_5) in an aliquot portion of the solution by one of the methods described at 7 and 11 above.

CITRATE-INSOLUBLE PHOSPHORIC ACID.

13

PREPARATION OF AMMONIUM CITRATE SOLUTION.

Dissolve 370 gm. of citric acid in 1,500 c.c. of water and nearly neutralize with ammonia. Cool. Add ammonia until exactly neutral to corallin (saturated alcoholic solution). Dilute sufficiently to make the specific gravity 1.09 at 20°C.

14

DETERMINATION.

Heat 100 c. c. of ammonium citrate solution in a loosely stoppered flask to 65°C. by placing it in a warm water bath. When the solution has attained this temperature, introduce 2 gm. of sample which must be free of acid. Close the flask, shake and replace in the water-bath. Maintain at 65°C. mixing the contents vigorously every 5 minutes. At the expiration of exactly 30 minutes, remove the flask from the bath, filter the contents rapidly through a quick-acting filter, and wash repeatedly with water at 65°C. allowing the filter to drain completely each time. Stop the washing when about 350 c. c. of filtrate have passed through. Transfer the filter and its contents to a crucible ignite and digest with 10-15 c. c. strong hydrochloric acid until the phosphate is dissolved. If there is fear of loss of phosphoric acid during ignition, treat the filter paper and its contents with 30-35 c. c. strong nitric acid and 5-10 c. c. hydrochloric acid and boil until all the phosphate is dissolved. Dilute, filter, make up to 250 c. c. and determine the phosphoric acid by one of the methods described previously at 7 and 11.

If the sample is acidulated (e.g. superphosphate) employ the residue obtained from the determination of the water-soluble phosphoric acid. In this instance, drop the filter and residue from this treatment into the citrate solution, close the flask and shake until the filter is reduced to pulp. Then proceed as above.

15

CITRATE-SOLUBLE PHOSPHORIC ACID.

The citrate-soluble phosphoric acid is determined by difference. Subtract the sum of water-soluble and citrate-insoluble from the total phosphoric acid to get the citrate-soluble phosphoric acid.

ORGANIC AND AMMONIACAL NITROGEN ONLY.

Kjeldahl Method.

16

REAGENTS.

(a) *Standard sulphuric acid.* Dilute pure sulphuric acid with about half its volume of water, cool and determine its specific gravity. From the specific gravity the percentage of sulphuric acid (H_2SO_4) is calculated by Marshall's formula.

$P = S (85.87 + 0.05 T - 0.0004 T^2) - 69.82$ where P = percentage of H_2SO_4 by weight, S = specific gravity at $T^\circ\text{C}$. compared with water at $T^\circ\text{C}$. The formula holds good between 0°C . and 40°C . for acids containing 62—82 per cent. H_2SO_4 . Calculate the weight of acid required to make up a standard solution from the formula $W = n A \times \frac{100}{T}$, where W = the weight of acid to be used, A = the number of grams of H_2SO_4 per litre in the required standard solution, and n = the number of litres of solution required. Weigh out W grams of acid and make up to n litres. $N/7$ acid is convenient for most fertilizers. Where small amounts of nitrogen have to be determined, $N/10$ acid may be used instead.

The strength of this acid is checked as follows :—

- (1) Precipitate 25 c.c. of acid with barium chloride solution and weigh the barium sulphate formed.
- (2) Weigh out accurately about 0.4 gm. of pure recrystallized ammonium chloride into a flask, add a slight excess of sodium or potassium hydrate and distill off the ammonia into 25 c.c. of the new standard acid. Titrate back the excess of acid by means of standard alkali and calculate the strength of the acid by noting the amount which is neutralized by the known weight of ammonia, evolved from the ammonium chloride taken.

(b) *Standard alkali.* Prepare a solution of caustic soda exactly equal in strength to the standard acid.

(c) *Sulphuric acid.* Use acid of specific gravity 1.84, free from nitrogen.

(d) *Potassium sulphate.* Pure, free from nitrogen.

(e) *Copper sulphate.* Crystallized.

(f) *Mercuric oxide.* Pure, free from nitrate.

(g) *Sodium sulphide.* Take a 30 per cent. solution of caustic soda and pass sulphuretted hydrogen until it is saturated.

(h) *Sodium hydroxide.* A solution of specific gravity 1.263 at 30°C , i.e., approximately of 30 per cent. strength.

(i) *Methyl red solution.* Dissolve 1 gram. of methyl red in 100 c.c. of 95 per cent. alcohol.

(j) *Methyl orange solution.* Dissolve 0.5 gram. in 500 c.c. of distilled water.

17

DETERMINATION.

(a) *Pusa Method.* Place 0.7—3.5 gram. of substance, according to the nitrogen content of material to be analysed, in a Kjeldahl flask and add 1 gram. of copper sulphate and a suitable quantity (20—30 c.c.) of sulphuric acid. Apply heat, taking care that the preliminary heating is not forced. After the organic matter has gone into solution and the liberated water has been expelled, cool somewhat and add 10 gram. of anhydrous potassium sulphate, a little at a time. Heat the mixture until pure green in colour. Continue the boiling for 15 minutes after the liquid has become clear. Transfer the acid liquid to a 1.5 litres flask, together with the washings and make up the volume to about 500 c.c. Add the necessary quantity of soda solution, taking care to pour it down the side of the flask so as to avoid admixture of the two liquids at this stage. The alkali sinks to the bottom and the surface remains acid. When all connections have been made, mix the liquids and, by admitting steam, carry out the distillation in a fairly rapid manner. Collect 300 c.c. of the distillate in a measured excess of standard acid to which methyl red or methyl orange has been added to serve as indicator. Titrate the excess of acid with standard alkali.

Previous to use, the reagents should be tested by a blank experiment with sugar or filter paper.

(b) *Dyer's method.* This method has been found satisfactory for the determination of organic nitrogen in refractory substances. Place 0.7—3.5 gram. of substance, according to its nitrogen content, in a Kjeldahl flask. Add 0.7 gram. of mercuric oxide and then 25 c.c. of sulphuric acid and mix. Heat up gently. After the organic matter has gone into solution and the liberated water expelled, cool somewhat, add 10 gram. powdered potassium sulphate and proceed as directed under (a) above, except that when proceeding to distil off the ammonia, 2 c.c. of sodium sulphide solution are to be added to the soda solution.

TOTAL NITROGEN.

Kjeldahl Method modified to include the Nitrogen of Nitrates.

18

REAGENTS.

In addition to those specified under 16, the following reagents are required.

Sulphuric acid containing salicylic acid. Add 1 gram salicylic acid to every 30 c.c. of nitrogen-free strong sulphuric acid.

Sodium thiosulphate. Recrystallized.

19

DETERMINATION.

Place 0.7—3.5 gm. according to the nitrogen content of the material, in a Kjeldahl flask. Add 30—40 c.c. of the sulphuric acid containing salicylic acid, shake until thoroughly mixed, and allow to stand for at least 30 minutes. Add 5 gm. of crystallized sodium thiosulphate, mix, place in the heating stand and heat over a low flame until all danger of frothing has passed. Increase the flame until the acid boils briskly and continue the boiling until white fumes no longer escape from the flask. This requires about 10 minutes. Add approximately 1 gm. of copper sulphate and continue the boiling until the organic matter has gone into solution. Next add 10 gm. of potassium sulphate, a little at a time. Boil and continue the boiling for at least 15 minutes after the liquid in the flask is quite clear. The distillation and titration are then carried out as usual.

20

AMMONIACAL NITROGEN.

Place 0.7—3.5 gm. according to the nitrogen content of the material, along with 200 c.c. of water and 5 gm. or more of magnesium oxide (free from carbonate), in a flask connected to a condenser. Distil 100 c.c. of the liquid into a measured quantity of standard acid and titrate back with standard alkali.

21

NITRIC AND AMMONIACAL NITROGEN.

Place 1 gm. of the sample, containing not more nitrate than the equivalent of 0.25 gm. potassium nitrate, in a 500 c.c. Kjeldahl flask. Add 30 c.c. of water and then introduce 5 gm. of reduced iron in small portions at a time. Mix to ensure complete solution of the soluble nitrate and ammonium salts. Add 10 c.c. of a mixture of equal volumes of sulphuric acid and water. Place a long-stemmed funnel in the neck of the flask to prevent mechanical loss and gently mix. Allow to stand until the violence of the reaction is over. Next apply heat slowly and boil for 5 minutes. Cool and transfer the contents into a distillation flask of 1.5 litres capacity. Add 30 c.c. of a 30 per cent. solution of caustic soda and distil with steam through a condenser into standard acid. The titration figures give the total nitrogen present as ammonium salts and nitrates.

POTASH.

Platinum Method.

22

REAGENTS.

(a) *Ammonium chloride solution.* Dissolve 100 grm. of ammonium chloride in 500 c.c. of water, add from 5–10 grm. of pulverized potassium, platonic chloride and shake at intervals for 6–8 hours. Allow the mixture to settle overnight and filter just before use. The residue may be used for the preparation of a fresh supply.

(b) *Platinum solution.* Use a solution containing the equivalent of 1 grm. of metallic platinum (2.1 grm. H_2PtCl_6) in every 10 c.c.

(c) 73.59 per cent. alcohol. Sp. gr. 0.8639 at 60°F./60°F., or 0.8593 at 20°C./4°C. This strength is equal to 80 per cent. by volume.

23

PREPARATION OF SOLUTION.

(a) *Mixed fertilizers; mixtures containing potash salt, superphosphate, wood ashes, etc.* Weigh out 5 grm. of the sample on a 12.5 cm. filter paper and wash with successive small amounts of boiling water until the filtrate amounts to about 400 c.c. Add to the hot solution a slight excess of ammonium hydroxide and then sufficient ammonium oxalate to precipitate all the lime present. Cool, dilute to 500 c.c., mix and pass through a dry filter before analysis.

(b) *Soluble potash salts; sulphate or muriate of potash kainite, sulphate of potash and magnesia.* Weigh out 5 grm. of the sample, transfer to a 12.5 cm. filter paper and wash with successive small quantities of boiling water until the volume is about 400 c.c. Cool, and make up to 500 c.c.

(c) *Organic substances; oilcakes, tobacco stems, etc.* To determine the total potash in organic fertilizers, saturate 10 grm. with strong sulphuric acid, and ignite in a muffle at a low red heat to destroy organic matter. Cool. Add a little strong hydrochloric acid, warm slightly to loosen the mass from the dish, dissolve in water and wash with hot water into a 500 c.c. graduated flask until the volume is about 400 c.c. Add to the hot solution ammonia and ammonium oxalate as in (a), cool and finally dilute to 500 c.c. Mix and pass through a dry filter before analysis.

24

DETERMINATION.

(a) *Mixed fertilizers.* Evaporate 50 c.c. of the solution, made according to (a) above, corresponding to 0.5 grm. of the sample

nearly to dryness, add 1 c.c. of dilute sulphuric acid (1 to 1), evaporate to dryness and ignite to whiteness. As all the potash is in the form of sulphate no loss by volatilization need be apprehended and a full red heat must be maintained until the residue is perfectly white. Dissolve the residue in hot water using at least 20 c.c. for each decigram of potash (K_2O). Add a few drops of hydrochloric acid and then platinum solution in excess. Evaporate on water-bath to a thick paste and treat the residue with 80 per cent. alcohol, avoiding exposure to ammonia. Wash the precipitate thoroughly with 80 per cent. alcohol both by decantation and on the filter, continuing the washing after the filtrate is colourless. Next wash with 10 c.c. of the ammonium chloride solution, to remove impurities from the precipitate and repeat 5 or 6 times. Wash again thoroughly with 80 per cent. alcohol and dry the precipitate for 30 minutes at $100^{\circ}C$. The precipitate should be perfectly soluble in water.

(b) *Water-soluble potash in wood ashes, etc.* Prepare the solution as directed in **23 (a)**, and determine the potash as in (a) above, paying special attention to the last sentence of (a).

(c) *Muriate of potash.* Take 50 c.c. of the solution prepared as directed under **23 (b)**, acidify with a few drops of hydrochloric acid, add 10 c.c. of the platinum solution and evaporate to thick paste. Then proceed as under (a) above.

(d) *Sulphate of potash, sulphate of potash and magnesia and kainite.* Take 50 c.c. of solution prepared as under **23 (b)**. Acidify with a few drops of hydrochloric acid and add 15 c.c. of platinum solution. Evaporate the solution and proceed as under (a) above, except that 25 c.c. portions of ammonium chloride solution should be used.

(e) *Organic compounds; oil cakes, tobacco stems, etc.* Prepare the solution as directed in **23 (c)** and determine the potash as in (a) above, paying special attention to the last sentence of (a).

For the conversion of potassium platonic chloride (K_2PtCl_6) to potassium chloride (KCl) use the factor 0.3067; to potassium sulphate (K_2SO_4), 0.3585; to potassium oxide (K_2O), 0.1938. (Calculations based on atomic weight of platinum=195.2).

Perchlorate method.

25

REAGENTS.

(a) *Perchloric acid.* A solution of 20 per cent. strength (sp. gr. 1.12) is required. Care should be taken to ascertain that the perchloric acid

used is free from chloric acid [Page, "On the Perchlorate Method for the Estimation of Potassium in Soils, Fertilizers, etc.," *Jour. Agri. Sci.*, 14, (1924), 133]. Some samples of perchloric acid on the market contain traces of potash salts and also traces of sulphuric acid or sulphates. In view of this fact, it is necessary to make blank determinations, which should be carried out as follows:—

- (1) *Potash salts.* Evaporate 10 c.c. of the 20 per cent. perchloric acid nearly to dryness. Take up with 20 c.c. of 95 per cent. alcohol and after letting it stand for one hour filter the insoluble matter, if any, on a weighed Gooch crucible. Wash with 5 c.c. of 98 per cent. alcohol to remove traces of perchloric acid and then with 100 c.c. of alcohol saturated with potassium perchlorate. Dry to constant weight. The amount of potassium perchlorate, if any, found in this blank determination with 10 c.c. of perchloric acid used, should be deducted from the weight of the perchlorate found in the analysis. "Pure" perchloric acid has been known to contain 0.0010—0.0015 gm. potassium perchlorate per 10 c.c., and sometimes even larger amounts have been noted.
- (2) *Sulphuric acid or sulphates.* If the perchloric acid contains a trace of sulphuric acid, a turbidity due to barium sulphate appears on adding 5 c.c. of perchloric acid to the solution filtered from the baryta treatment and evaporating. Traces of sulphuric acid, formed by the combustion of coal gas from the burners used to heat the sand-bath, may also produce a slight precipitate of barium sulphate during the evaporation. The error from these causes is most simply obviated as follows. After drying and weighing the perchlorate in the Gooch crucible, dissolve the precipitate by washing with 300 c.c. of boiling water. Weigh the Gooch crucible after drying it at 120° C., and compare its weight with that before collecting the precipitate. If there is any increase in weight, due to insoluble barium sulphate, the second weight (after the washing with boiling water) should be used to calculate the weight of the perchlorate. This procedure does not waste any time in practical working, as the perchlorate in a series of analyses is weighed in the same Gooch crucible, each lot of perchlorate after weighing being washed away with boiling water.

- (b) *Baryta solution.* Prepare a solution of 3 per cent. strength.
- (c) 95 per cent. alcohol.
- (d) 98 per cent. alcohol.

(e) *Alcohol saturated with potassium perchlorate.* Put ordinary 95 per cent. alcohol into a Winchester quart, along with about 2–3 gm. of finely powdered pure potassium perchlorate, obtained from previous analyses. Shake the mixture several times during 48 hours so as to fully saturate it. The solution is then ready for use. Every time the alcohol is wanted for washing purposes, thoroughly shake the contents of the bottle and filter the alcohol into a wash bottle. This ensures the washing liquid being saturated at the actual temperature of working. The alcohol should be perfectly clear. The test for proper saturation is that when 100 c.c. of it is used to wash a precipitate of pure potassium perchlorate, the loss of weight is less than 0.0001 gm.

26

PREPARATION OF SOLUTION.

Proceed as directed under 23.

27

DETERMINATION.

(a) *Sulphate of potash, kainite, sulphate of potash and magnesia, and mixed fertilizers.* Transfer 50 c.c. of the solution, prepared as directed under 23(b) and representing 0.5 gm. of the original sample, to a 7 cm. porcelain dish, add 15 c.c. of barium hydroxide solution, warm, add ammonium carbonate solution to precipitate the excess of barium, filter and evaporate the filtrate to dryness on a steam bath. Ignite the residue over a Bunsen burner below a red heat for 15 minutes. Extract the residue with boiling water, breaking up the material with a small glass pestle made from a piece of $\frac{1}{4}$ inch glass rod, filter into an evaporating dish (preferably of Jena or Resistance glass) of about 175 c.c. capacity and wash with boiling water until the filtrate amounts to about 150 c.c. Add 5 c.c. of 20 per cent. perchloric acid (sp. gr. 1.12) and evaporate on steam or sand bath until it fumes strongly. Take up the residue with 10 c.c. of water, add a second 5 c.c. of perchloric acid and again evaporate the solution on the sand bath until all free hydrochloric acid is driven off and dense white fumes of perchloric acid appear. Cool, add 20 c.c. of 95 per cent. alcohol, stir, allow to stand half an hour, and decant the whole of the alcohol through a weighed filter paper, or preferably a Gooch crucible, draining as thoroughly as possible. Wash the precipitate on to the filter paper or Gooch crucible with the help of 5 c.c. of 98 per cent. alcohol in order to remove traces of perchloric acid. Thoroughly wash with about 125 c.c. of 95 per cent. alcohol previously saturated with pure potassium perchlorate at the temperature of working. Dry to constant weight at 120°C. and weigh. Wash again with another 50 c.c. of saturated alcohol and again weigh. If the loss

in weight exceeds 0.0005 grm., rewash the precipitate until constant in weight. After weighing, dissolve the precipitate from the crucible in hot water and again weigh for the next analysis. There should at this stage be no insoluble residue. If such is present, it is due to the occurrence of sulphates or sulphuric acid as an impurity in the perchloric acid used giving rise to barium sulphate [see **25 (a)** (2) above]. In such cases the weight of the insoluble residue should be deducted to obtain the weight of true perchlorate.

NOTE.— Care must be taken not to evaporate the solutions to which baryta has been added, in the same hood as those in which the final solution containing perchloric acid are being evaporated. If ammonium salts are present in the former solutions, they give off ammonia which is taken up by the perchloric acid solutions, forming ammonium perchlorate, which behaves like potassium perchlorate.

For the conversion of potassium perchlorate (KClO_4) to potassium chloride (KCl) use the factor 0.5381 ; to potassium sulphate (K_2SO_4), 0.6289 ; to potassium oxide (K_2O), 0.3400.

(b) Muriate of potash. Proceed as directed under **(a)** above, but the treatment with baryta can be omitted.

(c) Organic fertilizers. Take 50 c.c. of the solution prepared as in **23 (c)** and proceed as directed under **(a)** above.

PUBLICATIONS OF THE IMPERIAL DEPARTMENT OF AGRICULTURE IN INDIA

TO BE HAD FROM

THE MANAGER, GOVERNMENT OF INDIA CENTRAL PUBLICATION BRANCH,
8, HASTINGS STREET, CALCUTTA;

THE OFFICE OF THE AGRICULTURAL ADVISER TO THE GOVERNMENT OF
INDIA, PUSA, BIHAR;

AND

ALL AGENTS FOR SALE OF GOVERNMENT PUBLICATIONS.

A complete list of the publications of the Imperial Department of Agriculture in India can be obtained on application from the above-mentioned.

These publications are :—

1. The *Agricultural Journal of India*. A Journal dealing with subjects connected with agricultural economics, field and garden crops, economic plants and fruits, soils, manures, methods of cultivation, irrigation, climatic conditions, insect pests, fungus diseases, co-operative credit, agricultural cattle, farm implements, and other agricultural matters in India. Illustrations, including coloured plates, form a prominent feature of the Journal. It is edited by the Agricultural Adviser to the Government of India, and is issued once every two months or six times a year. *Annual Subscription*, Rs. 6 or 9s. 6d., including postage. Single copy, R. 1-8 or 2s.
2. Scientific Reports of the Agricultural Research Institute, Pusa.
3. Annual Review of Agricultural Operations in India.
4. Proceedings of the Board of Agriculture in India.
5. Proceedings of Sectional Meetings of the Board of Agriculture.
6. Memoirs of the Imperial Department of Agriculture in India.
 - (a) Botanical Series.
 - (b) Chemical Series.
 - (c) Entomological Series.
 - (d) Bacteriological Series.
 - (e) Veterinary Series.

7. Bulletins issued by the Agricultural Research Institute, Pusa.

8. Indigo Publications.

9. Books.

The following are the publications of the last two years :—

- Scientific Reports of the Agricultural Research Institute, Pusa (including the Reports of the Imperial Dairy Expert, the Physiological Chemist, and Secretary, Sugar Bureau), for the year 1923-24. Price, R. 1 or 1s. 8d.
- Scientific Reports of the Agricultural Research Institute, Pusa (including the Reports of the Imperial Dairy Expert, Physiological Chemist, Government Sugarcane Expert, and Secretary, Sugar Bureau), for the year 1924-25. Price, Rs. 2-4 or 4s.
- Review of Agricultural Operations in India, 1922-23. Price, R. 1-10.
- Review of Agricultural Operations in India, 1923-24. Price, R. 1-9 or 2s. 9d.
- Proceedings of the Board of Agriculture in India, held at Bangalore on 21st January, 1924, and following days (with appendices). Price, R. 1.
- Proceedings of the Cattle Conference, held at Bangalore on 22nd and 23rd January, 1924 (with appendices). Price, As. 9.

MEMOIRS OF THE DEPARTMENT OF AGRICULTURE IN INDIA

Botanical Series

- Vol. XII, No. IV. Studies in Indian Oil Seeds. No. 2. Linseed, by GABRIELLE L. C. HOWARD, M.A., and ABDUR RAHMAN KHAN. Price, R. 1-4 or 2s.
- Vol. XII, No. V. Studies in Gujarat Cottons, Part II, by MAGANLAL L. PATEL, B.A.G. Price, R. 1-12 or 3s.
- Vol. XIII, No. I. Studies in Indian Tobaccos. No. 4.—Parthenocarp and Parthenogenesis in the varieties of *Nicotiana Tabacum* L. var. *Cuba* and var. *Miroslata*, by GABRIELLE L. C. HOWARD, M.A., and KASHI RAM. No. 5.—The Inheritance of Characters in *Nicotiana rustica* L., by GABRIELLE L. C. HOWARD, M.A. Price, Rs. 2 or 2s. 9d.
- Vol. XIII, No. II. The Wilt Disease of Safflower, by S. D. JOSHI, B.Sc. Price, R. 1 or 1s. 6d.
- Vol. XIII, No. III. Studies in Indian Fibre Plants, No. 3. On the Inheritance of Characters in *Hibiscus Sabdariffa* L., by ALBERT HOWARD, C.I.E., and GABRIELLE L. C. HOWARD, M.A. Price, Rs. 2 or 3s.
- Vol. XIII, No. IV. The Mahali Disease of Coconuts in Malabar, by S. SUNDARARAMAN, M.A., and T. S. RAMAKRISHNAN, B.A. Price, As. 12 or 1s.
- Vol. XIII, No. V. The Eradication of *Cyperus rotundus* L. A Study in Pure and Applied Botany, by S. B. RAMADE, B.Sc., and arranged and written by W. BURNS, D.Sc. Price, Rs. 2-4 or 3s.
- Vol. XIII, No. VI. Studies in Diseases of the Jute Plant. (2) *Macrophoma Corchori* Saw., by F. J. F. SHAW, D.Sc., A.B.C.S., F.L.S. Price, As. 8 or 9d.
- Vol. XIV, No. I. A Study of Some Indian Grasses and Grasslands, by W. BURNS, D.Sc., L. B. KULKARNI, M.A., and S. R. GODBOLE, B.Sc., B.A.G. Price, As. 12 or 1s. 3d.

Chemical Series

- Vol. VII, No. IV. Some Digestibility Trials on Indian Feeding Stuffs, by P. E. LANDER, M.A., D.Sc., A.L.C., and PANDIT LAL CHAND DHARMANI, L.A.G. Price, As. 12 or 1s.
- Vol. VII, No. V. The Buffer Action of Some Burma Soils, by J. CHARLTON, M.Sc. Price, As. 12 or 1s.
- Vol. VII, No. VI. Studies in the Chemistry of Sugarcane, II. Some Factors that determine the ripeness of Sugarcane, by R. VISWANATH, F.I.C., and S. KASHINATHA AYYAR, B.A. Price, As. 8 or 9d.
- Vol. VII, No. VII. The Phosphatic Nodules of Trichinopoly and the availability of Flour Phosphate as a Manure for Paddy, by RAO SAMB M. R. RAMASWAMI SIVAN, B.A., Dip. Agri. Price, R. 1-4 or 2s.
- Vol. VIII, No. I. The Quality and Yield of Tobacco as influenced by Manurial and other Operations, by J. N. MUKERJI, B.A., B.Sc. Price, As. 8 or 9d.
- Vol. VIII, Nos. II—IV. Investigations on Indian Opium. No. 4.—Further Experiments on the Influence of Manures on the Yield and Morphine Content of the Latex of the Opium Poppy, by HAROLD E. ANNETT, D.Sc., F.I.C., M.S.E.A.C., and HARIDAYAL SINGH, B.Sc. No. 5.—Experiments on Oil-content of the Seed of the Opium Poppy; and No. 6.—Studies on the Ash Constituents of Indian Opium, by HAROLD E. ANNETT, D.Sc., F.I.C., M.S.E.A.C., and M. N. BOSE, M.A. Price, As. 8 or 10d.
- Vol. VIII, No. V. Nitrogen Recuperation in the Soils of the Bombay Deccan, Part I, by D. L. SAHASRABUDHHE, M.A., M.Sc., and J. A. DAIJI, B.A.G., B.Sc. Price, As. 4 or 5d.
- Vol. VIII, No. VI. The Determination of available Phosphoric Acid of Calcareous Soils, by SURENDRALAL DAS, M.Sc. (*In the press.*)
- Vol. VIII, No. VII. Deterioration of Sugarcane during its Storage by Windrowing, by PHANI BROSAN SANYAL, M.Sc. Price, As. 6 or 8d.
- Vol. VIII, No. VIII. Drainage Waters at Cawnpore, by H. N. BATHAM, M.A., F.L.S. (*In the press.*)
- Vol. VIII, No. IX. Nutrients required for Milk Production with Indian Foodstuffs, by F. J. WATERS, M.Sc., LAHR SINGH, L.A.G., B.Sc.(Ag.), and S. M. HUSAIN, B.Sc. (*In the press.*)
- Vol. VIII, No. X. Silage Experiments at Nagpur, by HAROLD E. ANNETT, D.Sc., F.I.C., M.S.E.A.C., and A. R. PADMANABHA AYYER, B.A. (*In the press.*)

Entomological Series

- Vol. VIII, Nos. V—IX. Papers on Indian Tabanidae, by P. V. ISAAC, B.A., D.I.C., M.Sc., F.E.S.; Two *Drosophilids* from Coimbatore and a New Aphidiphagous Fly, by J. R. MALLOCH; Notes on Indian Odonata in the Pusa Collection, by MAJOR F. C. FRASER, F.M.S.; On New and Old Oriental Cicadellids, by Dr. WALTERS HORN. Price, R. 1-4 or 2s.
- Vol. VIII, Nos. X & XI. Papers on Indian Tabanidae, by P. V. ISAAC, B.A., D.I.C., M.Sc., F.E.S.; and Some Indian Species of the Dipterous Genus *Atherigona*, Rondani, by J. R. MALLOCH. Price, R. 1-3 or 2s.

Entomological Series—*contd.*

- Vol. VIII, No. XII. The Nim Mealy Scale (*Pulvinaria nazima*, Green), by T. V. RAMAKRISHNA
 AYYAR, B.A., F.E.S. Price, R. 1-4 or 2s.
- Vol. IX, No. I—
 III. A Contribution towards a Monograph of the Indian Coniopterygidae (Neuroptera), by C. L. WIRTHYCOMBE, Ph.D., M.Sc., D.I.C. Papers on Indian Tabanidae and Some Observations on the Life-history and Habits of *Phycus brunneus*, Wied. (Family Therevidae), by P. V. ISAAC, B.A., M.Sc., D.I.C., F.E.S. Price, Rs. 2-2 or 4s.
- Vol. IX, No. IV. The Red Pumpkin Beetle, *Aulacophora abdominalis*, Fb. (Coleoptera: Chrysomelidae) and its Control; with a short Note on *A. atripennis*, Fb., by M. AFZAL HUSAIN, M.Sc., M.A., and S. ABDULLAH SHAH, L.A.G. (*In the press*).
- Vol. IX, No. V. Experiments on the Transmission of Rinderpest by means of Insects, by S. K. SEN, B.Sc., F.E.S. (*In the press*).

Bacteriological Series

- Vol. II, No. I. Nitrogen Fixation in the Punjab, by P. E. LANDER, M.A., D.Sc., A.I.C., and BARKAT ALI, L.A.G. Price, As. 8 or 10d.

Veterinary Series

- Vol. III, No. VI. Nasal Granuloma in Cattle, by V. KRISHNAMURTI AYYAR, I.V.S. Price, R. 1 or 1s. 6d.

Bulletins issued by the Agricultural Research Institute, Pusa

- No. 150. The Improvement of Fodder and Forage in India (Papers read before a Joint Meeting of the Sections of Agriculture and Botany, Indian Science Congress, Lucknow, 1923), edited by GABRIELLE L. C. HOWARD, M.A. Price, As. 6.
- No. 151. A method for the Accurate Determination of Carbonic Acid present as Carbonate in Soils by PHANI BHUSAN SANYAL, M.Sc. Price, As. 2.
- No. 152. The External Morphology and Bionomics of the Commonest Indian Tick (*Hyalomma aegyptium*), by MOHAMMAD SHARIF, M.A., F.R.M.S. Price, R. 1.
- No. 153. Tamarind as a source of Alcohol and Tartaric Acid, by H. N. BATHAM, M.A., and I. S. NIGAM, L.A.G. Price, As. 3 or 4d.
- No. 154. The Bionomics of the Sarcopic Mange Parasite of the Buffalo with some observations concerning the relative power of resistance to adverse conditions of the different stages of the Acarus and of its egg, by T. M. TIMONEY, M.R.C.V.S. Price, As. 2.
- No. 155. List of Publications on Indian Entomology, 1923 (compiled by the Imperial Entomologist). Price, As. 11 or 1s.
- No. 156. Bud and Boll Shedding in Cotton, by G. R. HILSON, B.Sc., V. RAMANATHA AYYAR, L.A.G., and R. CHOKEELINGAM PILLAI, L.A.G. Price, As. 14 or 1s. 6d.
- No. 157. The Experimental Sullage Farm, Lyallpur, by P. E. LANDER, M.A., D.Sc., A.I.C. Price, As. 12 or 1s. 3d.
- No. 158. A New Fodder (Silosed *Shieham* Leaves) for Dairy Cows, by P. E. LANDER, M.A., D.Sc., A.I.C., and LAL CHAND DHARMANI, L.A.G. Price, As. 6 or 8d.
- No. 159. Preliminary Investigations in the Bacteriology of Milk, by J. H. WALTON, M.A., M.Sc. Price, As. 6 or 8d.
- No. 160. Bot Flies of the Punjab, by H. E. CROSS, M.R.C.V.S., D.V.M., A.Sc. (*In the press*).
- No. 161. Publications on Indian Entomology, 1924 (compiled by the Imperial Entomologist). Price, As. 8 or 9d.
- No. 162. Tentative Keys to the Orders and Families of Indian Insects, by T. BAINBRIDGE FLETCHER, B.N., F.L.S., F.E.S., F.Z.S. Price, R. 1-4 or 2s. 3d.
- No. 163. Loss of Sugar by inversion in Sugar Factories in Northern India and its prevention by Antiseptic Measures, by C. M. HUTCHINSON, C.I.E., B.A., and C. S. RAMAYYAR, B.A. Price, As. 2 or 3d.
- No. 164. Standard Methods of Analysis of Fertilizers, edited by J. SEN, M.A., Ph.D. Price, As. 4 or 6d.

Books

- Wheat in India, by ALBERT HOWARD, M.A., A.R.C.S., F.L.S., and GABRIELLE L. C. HOWARD, M.A. Price, Rs. 5 or 7s. 6d.
- A Description of the Imperial Bacteriological Laboratory, Muktesar; Its Work and Products, by MAJOR J. D. E. HOLMES, M.A., D.Sc., M.R.C.V.S. Price, As. 8 or 9d.
- Agriculture in India, by JAMES MACKENZIE, M.A., I.C.S. Price, As. 4 or 5d.
- Some Diseases of Cattle in India. A Handbook for Stock-owners. Price, As. 8 or 9d.
- Report on the Diseases of Silkworms in India, by A. PHINGLE JAMSON, D.Sc. Price, Rs. 3.

Notice

All new publications are included in the above list and are regularly posted to all on the mailing list as soon as issued. Unless complaints of non-receipt are received by the Manager, Government of India Central Publication Branch, 8, Hastings Street, Calcutta, within six months of the date of issue, duplicate copies can be supplied only on payment of cost and postage.

PUBLICATIONS OF THE IMPERIAL DEPARTMENT OF AGRICULTURE IN INDIA

TO BE HAD FROM

THE MANAGER, GOVERNMENT OF INDIA CENTRAL PUBLICATION BRANCH, IMPERIAL
SECRETARIAT BUILDING, 3, GOVERNMENT PLACE, WEST, CALCUTTA;

THE OFFICE OF THE AGRICULTURAL ADVISER TO THE GOVERNMENT OF
INDIA, PUSA, BIHAR;

AND

ALL AGENTS FOR SALE OF GOVERNMENT PUBLICATIONS.

A complete list of the publications of the Imperial Department of Agriculture in India can be
obtained on application from the above-mentioned.

These publications are:—

1. *The Agricultural Journal of India*. A Journal dealing with subjects connected with agricultural economies, field and garden crops, economic plants and fruits, soils, manures, methods of cultivation, irrigation, climatic conditions, insect pests, fungus diseases, co-operative credit, farm implements, and other agricultural matters in India. Illustrations, including coloured plates, form a prominent feature of the Journal. It is edited by the Agricultural Adviser to the Government of India, and is issued once every two months or six times a year. *Annual Subscription*, Rs. 6 or 6s. 6d., including postage. Single copy, R. 1-8 or 2s.
2. *The Journal of the Central Bureau for Animal Husbandry and Dairying in India*. A quarterly dealing with cattle breeding, dairying, cultivation and storage of fodder crops, animal nutrition, and other aspects of animal husbandry. It is edited by the Agricultural Adviser to the Government of India. *Annual subscription*, Rs. 2-8. Single copy, As. 10.
3. Scientific Reports of the Agricultural Research Institute, Pusa.
4. Annual Review of Agricultural Operations in India.
5. Proceedings of the Board of Agriculture in India.
6. Proceedings of Sectional Meetings of the Board of Agriculture.
7. Memoirs of the Imperial Department of Agriculture in India.

- (a) Botanical Series.
- (b) Chemical Series.
- (c) Entomological Series.
- (d) Bacteriological Series.
- (e) Veterinary Series.

- 8. Bulletins issued by the Agricultural Research Institute, Pusa.
- 9. Books.

The following are the publications of the last two years:—

- Scientific Reports of the Agricultural Research Institute, Pusa (including the Reports of the Imperial Dairy Expert, the Physiological Chemist, Government Sugarcane Expert, and Secretary, Sugar Bureau), for the year 1924-25. Price, Rs. 2-4 or 4s.
- Scientific Reports of the Agricultural Research Institute, Pusa (including the Reports of the Imperial Dairy Expert, Physiological Chemist, Government Sugarcane Expert, and Secretary, Sugar Bureau), for the year 1925-26. Price, Rs. 2-8 or 4s. 6d.
- Review of Agricultural Operations in India, 1923-24. Price, R. 1-0 or 2s. 9d.
- Review of Agricultural Operations in India, 1924-25. Price, Rs. 2-2 or 4s.
- Proceedings of the Board of Agriculture in India, held at Pusa on 7th December, 1925, and following days (with appendices). Price, R. 1-14 or 2s. 3d.

MEMOIRS OF THE DEPARTMENT OF AGRICULTURE IN INDIA

Botanical Series

- Vol. XIV, No. I. A Study of Some Indian Grasses and Grasslands, by W. BUENS, D.Sc., L. B. KULKARNI, M.A., and S. R. GODBOLE, B.Sc., B.A.G. Price, As. 12 or 1s. 3d.
- Vol. XIV, No. II. Studies in Gujarat Cottons, Part III. The Wagad Cotton of Upper Gujarat, Kathiawad and Kutch, by MAGANTAL L. PATEL, M.A.G., and D. P. MANKAD. Price, R. 1-4 or 2s. 3d.
- Vol. XIV, No. III. Sugarcane Breeding—Indications of Inheritance, by RAO SAMB T. S. VENKATRAMAN, B.A. Price, As. 8 or 10d.
- Vol. XIV, No. IV. Studies in Gujarat Cottons, Part IV: Hybrids between Broach-deahi and Goghari varieties of gossypium herbaceum, by M. L. PATEL, M.A.G., and S. J. PATEL, B.A.G. Price, As. 14 or 1s. 6d.
- Vol. XIV, No. V. The Indigenous Cotton Types of Burma, by T. D. Stock, B.Sc., D.I.C., A.R.C.S. (*In the press.*)
- Vol. XIV, No. VI. A Study of *Fusaria* common to cotton plants and cotton soils in the Central Provinces, by Jivan Singh, M.Sc. (*In the press.*)
- Vol. XIV, No. VII. The Kolamba Rice of the North Konkan and its Improvement by Selection, by R. K. Bhide and S. G. Bhalerao, B. Ag. (*In the press.*)
- Vol. XIV, No. VIII. *Pennisetum typhoides*: Studies on the Pajri crop. I. The Morphology of *Pennisetum typhoides*, by S. V. Godbole, M. Sc., B. Ag. (*In the press.*)

Chemical Series

- Vol. VIII, No. I. The Quality and Yield of Tobacco as influenced by Manurial and other Operations, by J. N. MUKERJI, B.A., B.Sc. Price, As. 8 or 9d.
- Vol. VIII, Nos. II —IV. Investigations on Indian Opium. No. 4.—Further Experiments on the Influence of Manures on the Yield and Morphine Content of the Latex of the Opium Poppy, by HAROLD E. ANNETT, D.Sc., F.I.C., M.S.E.A.C., and HARIDAS SINGH, B.Sc. No. 5.—Experiments on Oil-content of the Seed of the Opium Poppy; and No. 6.—Studies on the Ash Constituents of Indian Opium, by HAROLD E. ANNETT, D.Sc., F.I.C., M.S.E.A.C., and M. N. BOSE, M.A. Price, As. 8 or 10d.
- Vol. VIII, No. V. Nitrogen Recuperation in the Soils of the Bombay Deccan, Part I, by D. L. SAHASRABUDHE, M.A.G., M.Sc., and J. A. DAJI, B.A.G., B.Sc. Price, As. 4 or 5d.
- Vol. VIII, No. VI. The Determination of available Phosphoric Acid of Calcareous Soils, by SURENDRALAL DAS, M.Sc. Price, As. 12 or 1s. 3d.
- Vol. VIII, No. VII. Deterioration of Sugarcane during its Storage by Windrowing, by PHANI BHUSAN SANYAL, M.Sc. Price, As. 6 or 8d.
- Vol. VIII, No. VIII. Drainage Waters at Cawnpore, by H. N. BATHAM, M.A., F.I.C.S. Price, As. 10 or 1s.
- Vol. VIII, No. IX. Nutrients required for Milk Production with Indian Foodstuffs, by F. J. WARTHE, M.Sc., LALU SINGH, L.A.G., B.Sc. (Ag.), and S. M. HUSAIN, B.Sc. Price, As. 14 or 1s. 6d.
- Vol. VIII, No. X. Silage Experiments at Nagpur, by HAROLD E. ANNETT, D.Sc., F.I.C., M.S.E.A.C., and A. R. PADMANABHA AIVER, B.A. Price, As. 10 or 1s.
- Vol. VIII, No. XI. Nutrients required for Growth Production with Indian Foodstuffs, by F. J. WARTHE, M.Sc., and IZAL AHMAD, B.Sc. (Ag.) Price, As. 3 or 4d.
- Vol. VIII, No. XII. A Study of Absorption of Moisture by Soils by J. SEN, M.A., Ph.D., and BRU-LAL M. AMIN, B.A. Price, As. 6 or 9d.
- Vol. IX, No. I. The Selection of Burma Beans (*Phaseolus lunatus*) for Low Prussic Acid Content, by J. CHARLTON, M.Sc., F.I.C. Price, As. 10 or 1s.
- Vol. IX, No. II. Bangalore Maintenance Experiments, First Series, by F. J. WARTHE, M.Sc. Price, As. 11 or 1s. 2d.
- Vol. IX, No. III. Some Digestibility Trials on Indian Feeding Stuffs II, by P. E. LANDER, M.A., D.Sc., A.I.C., and PANDIT LAL CHAND DHARMANI, L.A.G., B.Sc. (Ag.) Price, As. 10 or 1s.
- Vol. IX, No. IV. The Effect of Manuring a Crop on the Vegetative and Reproductive Capacity of the Seed, by B. VISWANATH, F.I.C., and M. SRINIVARAYANA, B.Sc. Price, As. 14 or 1s. 6d.

Entomological Series

- Vol. VIII, Nos. X & XI. Papers on Indian Tabanidae, by P. V. ISAAC, B.A., D.L.C., M.Sc., F.E.S.; and Some Indian species of the Dipterous Genus *Atherigona*. Rondani, by J. R. MALLOCH. Price, R. 1 8 or 2s.
- Vol. VIII, No. XII. The Nit Mealy Scale (*Pulvinaria marina*, Green), by T. V. RAMAKRISHNA AYYAR, B.A., F.E.S. Price, R. 1-4 or 2s.
- Vol. IX, Nos. I—III. A Contribution towards a Monograph of the Indian Coniopterygidae (Neuroptera), by C. L. WITHERCOMBE, Ph.D., M.Sc., D.L.C.; Papers on Indian Tabanidae and Some Observations on the Life-history and Habits of *Phycus brunneus*, Wied. (Family Theroidea), by P. V. ISAAC, B.A., M.Sc., D.L.C., F.E.S. Price, Rs. 2-2 or 4s.
- Vol. IX, No. IV. The Red Pumpkin Beetle, *Aulacophora abdominalis*, Fb. (Coleoptera: Chrysomelidae) and its Control; with a short Note on *A. atripennis*, Fb., by M. AFZAL HUSAIN, M.Sc., M.A., and S. ABDULLAH SHAH, L.A.G. Price, R. 1 or 1s. 9d.
- Vol. IX, No. V. Experiments on the Transmission of Rinderpest by means of Insects, by S. K. SEN, B.Sc., F.E.S. Price, Rs. 2-4 or 4s. 2d.
- Vol. IX, No. VI. Studies on Indian Thysanoptera, by DR. H. H. KARNY. Price, R. 1-8 or 2s. 6d.
- Vol. IX, Nos. VII—IX. New Species of Indian Gall Midges (*Monidiidae*), by E. P. FELT; New Indian Geometridae, by LEWIS B. PROUT, F.R.S.; Description of *Laspeyresia stirpicola*, n. sp. (Lepidoptera), by E. MEYRICK, F.R.S., with a short Note on the Life-history and Status, by C. S. MISRA, B.A. Price, As. 5 or 6d.
- Vol. X, Nos. I & II. Four New Indian Gall Midges, by Dr. E. P. FELT; The Citrus Psylla (*Diuraphina citri*, Kuw.), by M. AFZAL HUSAIN, M.Sc., M.A. (In the press.)
- Vol. X, No. III. Braconidae Vespioninae of South India, by T. V. RAMAKRISHNA AYYAR, B.A., F.E.S., F.Z.S. (In the press.)
- Vol. X, No. IV. Some New Indian Miridae (*Capsidae*), by E. BALLARD, B.A., F.E.S. (In the press.)

Bacteriological Series

- Vol. II, No. I. Nitrogen Fixation in the Punjab, by P. E. LANDER, M.A., D.Sc., A.L.C., and PARKAT ALI, L.A.G. Price, As. 8 or 10d.

Veterinary Series

- Vol. III, No. VI. Nasal Granuloma in Cattle, by V. KRISHNAMURTI AYYAR, L.V.S. Price, R. 1 or 1s. 6d.
- Vol. III, No. VII. Experiments on the treatment of Hookworm Infection in Dogs, by AMARNATH GULATI, M.Sc. (Punjab). Price, As. 11 or 1s. 3d.
- Vol. III, Nos. VIII & IX. On the occurrence of a Lung Fluke *Paragonimus discoides*, n. sp. in a Palm Civet (*Paradoxurus gravi*) in Kumaon Hills, by AMARNATH GULATI, M.Sc. (Punjab); On the occurrence of *Isoepora* and *Balanitidium* in Cattle, by H. COOPER, M.B.C.V.S., and AMARNATH GULATI, M.Sc. (Punjab). Price, As. 4 or 6d.
- Vol. IV, No. I. The Chemotherapy of Surra (*Trypanosoma Evansi* Infections) of Horses and Cattle in India, by J. T. EDWARDS, D.Sc., M.R.C.V.S. (In the press.)
- Vol. IV, No. II. Studies in Bovine Lymphangitis, by V. KRISHNAMURTI AYYAR. (In the press.)

Bulletins issued by the Agricultural Research Institute, Pusa

- No. 156. Bud and Boll Shedding in Cotton, by G. R. HILSON, B.Sc., V. RAMANATHA AYYAR, L.A.G., and B. CHOKKALINGAM PILLAI, L.A.G. Price, As. 14 or 1s. 6d.
- No. 157. The Experimental Sullage Farm, Lyallpur, by P. E. LANDER, M.A., D.Sc., A.L.C. Price, As. 12 or 1s. 3d.
- No. 158. A New Fodder (Silene *Shisham* Leaves) for Dairy Cows, by P. E. LANDER, M.A., D.Sc., A.L.C., and LAL CHAND DHARMANI, L.A.G. Price, As. 6 or 8d.
- No. 159. Preliminary Investigations in the Bacteriology of Milk, by J. H. WALTON, M.A., M.Sc. Price, As. 6 or 8d.
- No. 160. Bot Flies of the Punjab, by H. E. CROSS, M.B.C.V.S., D.V.E., A.Sc. Price, As. 14 or 1s. 6d.
- No. 161. Publications on Indian Entomology, 1924 (compiled by the Imperial Entomologist). Price, As. 8 or 9d.
- No. 162. Tentative Keys to the Orders and Families of Indian Insects, by T. BAINEBRIDGE FLETCHER, B.Sc., F.L.S., F.E.S., F.Z.S. Price, Rs. 1-4 or 2s. 3d.
- No. 163. Loss of Sugar by inversion in Sugar Factories in Northern India and its prevention by Antiseptic Measures, by C. M. HUTCHINSON, C.I.E., B.A., and C. S. RAMAAYAR, B.A. Price, As. 2 or 3d.
- No. 164. Standard Methods of Analysis of Fertilizers, by J. SEN, M.A., Ph.D. Price, As. 4 or 6d.

Bulletins issued by the Agricultural Research Institute, Pusa—*contd.*

- No. 165. **List of Publications on Indian Entomology, 1925 (compiled by the Imperial Entomologist, Pusa).** Price, As. 12 or 1s. 3d.
No. 166. **Sampling for Rice Yield in Bihar and Orissa,** by J. A. HUEBACH, I.C.S. Price, As. 7 or 6d.
No. 167. **A Scheme of Classification of the Varieties of Rice Found in Burma,** by R. A. BEATTIE. Price, As. 6 or 8d.

Books

- Wheat in India, by ALBERT HOWARD, M.A., A.R.C.S., F.L.S., and GABRIELLE L. C. HOWARD, M.A. Price, Rs. 5 or 7s. 6d.
A Description of the Imperial Bacteriological Laboratory, Muktesar; Its Work and Products, by MAJOR J. D. E. HOLMES, M.A., D.Sc., M.R.C.V.S. Price, As. 8 or 9d.
Agriculture in India, by JAMES MACKEFNA, M.A., I.C.S. Price, As. 4 or 5d.
Some Diseases of Cattle in India. A Handbook for Stock-owners. Price, As. 8 or 9d.
Report on the Diseases of Silkworms in India, by A. PRINCIE JAMESON, D.Sc. Price, Rs. 3.

Notice

All new publications are included in the above list and are regularly posted to all on the mailing list as soon as issued. Unless complaints of non-receipt of any publication are received by the Manager, Government of India Central Publication Branch, Imperial Secretariat Building, 3, Government Place, West, Calcutta, within six months of the date of issue, duplicate copies can be supplied only on payment of cost and postage.

Stetin No. 165

1926

Agricultural Research Institute, Pusa

List of publications on Indian Entomology, 1925

Compiled by the Imperial Entomologist and the Offg. Imperial Entomologist)



CALCUTTA: GOVERNMENT OF INDIA
CENTRAL PUBLICATION BRANCH
1926

the GOVERNMENT OF INDIA Central Education Branch,
8, Hastings Street, Calcutta, and from the following Agents :—

EUROPE.

OFFICE OF THE HIGH COMMISSIONER FOR INDIA,
42, GROSVENOR GARDENS, LONDON, S.W. 1.
And at all Booksellers.

INDIA AND CEYLON.

Provincial Book Depôts :

MADRAS :—Office of the Superintendent, Government Press, Mount Road, Madras.
BOMBAY :—Superintendent, Government Book Depôt, Town Hall, Bombay.
SIND :—Library attached to the Office of the Commissioner in Sind, Karachi.
BENGAL :—Office of the Bengal Secretariat Book Depôt, Writers' Buildings, Room No. 1, Ground Floor, Calcutta.
UNITED PROVINCES OF AGRA AND OUDH :—Office of the Superintendent of Government Press, United Provinces of Agra and Oudh, Allahabad.
PUNJAB :—Office of the Superintendent, Government Printing, Punjab, Lahore.
BURMA :—Office of the Superintendent, Government Printing, Burma, Rangoon.
CENTRAL PROVINCES AND BARSAT :—Office of the Central Provinces Secretariat, Nagpur.
ASSAM :—Office of the Superintendent, Assam Secretariat Press.
BIHAR AND ORISSA :—Office of the Superintendent, Government Printing, Bihar and Orissa, P. O. Cuttack, Patna.
COORG :—Office of the Chief Commissioner of Coorg, Bangalore.
NORTH-WEST FRONTIER PROVINCE :—Office of the Manager, Government Printing and Stationery, Peshawar.

Thacker, Spink & Co., Calcutta and Simla.
W. Newman & Co., Ltd., Calcutta.
R. Cambay & Co., Calcutta.
S. K. Lahiri & Co., Calcutta.
The Indian School Supply Depôt, 303, Bow Bazar Street, Calcutta, and 226, Nawabpur, Dacca.
Butterworth & Co. (India), Ltd., Calcutta.
Rai M. C. Sarwar Bahadur & Sons, 90-2A, Harrison Road, Calcutta.
The Weldon Library, 17, Park Street, Calcutta.
Standard Literature Company, Limited, Calcutta.
Association Press, Calcutta.
Chukerverty, Chatterjee & Co., Ltd., 13, College Square, Calcutta.
The Book Company, Calcutta.
James Murray & Co., 12, Government Place, Calcutta. (For Meteorological Publications only.)
Roy Choudhury & Co., 68/5, Russa Road, North, Calcutta.
Higginbotham & Co., Madras.
V. Kalyanaswami Iyer & Co., Madras.
P. R. Ramo Iyer & Co., Madras.
Rochouse and Sons, Madras.
Q. A. Nateson & Co., Publishers, George Town, Madras.
The Modern Stores, Salem, Madras.
Bright & Co., Trivandrum.
The Booklover's Resort, Talikad, Trivandrum, South India.
V. N. Sivasubramanian, Bookseller, West Tower Street, Madras.
E. M. Gopalakrishna Kone, Padumandapam, Madras.
Vijapur & Co., Vizagapatnam.
Thacker & Co., Ltd., Bombay.
D. B. Taraporevala, Sons & Co., Bombay.
Sunder Pandurang, Bombay.
Rama Chandra Govind & Sons, Kalbadevi, Bombay.
N. M. Tripathi & Co., Booksellers, Princess Street, Kalbadevi Road, Bombay.
R. E. Umashankar & Co., The Bharat Book Depôt, Dharwar.
Proprietor, New Kitabkhana, Poona.
The Manager, Oriental Book Supplying Agency, 15, Shukrawar, Poona City.
R. S. Gondhalkar's Book Depôt, Publisher and Bookseller, Budhwar Chawki, Poona City.
Managing Director, Co-operative Bookstall, Booksellers and Publishers, Poona City.
The Standard Bookstall, Karachi, Quetta, Delhi, Murree and Rawalpindi.
J. Ray & Sons, 43 K. & L. Edwardes Road, Rawalpindi.
The Standard Bookstall, Quetta.
The Standard Book Depôt, Lahore, Lucknow, Nalatala, Mussoorie, Dalhousie and Ambala Cantonment.

Karnandas Narandas & Sons, Surat.
Mangaldas & Sons, Booksellers and Publishers, Bhaga Talao, Surat.
Mrs. Radhabhai Atmaram Sagoon, Kalbadevi Road, Bombay.
A. H. Wheeler & Co., Allahabad, Calcutta and Bombay.
The Anand Book Depôt, Karachi.
A. B. Mathur, Supdt., Nasir Khan Road Press, Allahabad.
The North India Christian Tract and Book Society, 18, Clive Road, Allahabad.
Ram Dayal Agarwal, 184, Rattr, Allahabad.
Manager, Newal Kishore Press, Lucknow.
The Upper India Publishing House, Ltd., 4, Amnabad Park, Lucknow.
Munshi Seta Ram, Managing Proprietor, Indian Army Book Depôt, Juhl, Cawnpore.
Rai Sahib M. Gulab Singh & Sons, Muddi Am Press, Lahore and Allahabad.
Rama Krishna & Sons, Booksellers, Anarsali, Lahore.
Puri Brothers, Booksellers and Publishers, Katcheri Road, Lahore.
The Tilak School Bookshop, Lahore.
The Standard Bookstall, Lahore.
Manager of the Imperial Book Depôt, 55, Chandri Chawk Street, Delhi.
Oxford Book and Stationery Company, Delhi.
Supdt., American Baptist Mission Press, Rangoon.
Proprietor, Rangoon Times Press, Rangoon.
The Modern Publishing House, Ltd., 30, Phayre Street, Rangoon.
The International Buddhist Book Depôt, Post Box No. 971, Rangoon.
Burma Book Club, Ltd., Rangoon.
Manager, the "Hitavada," Nagpur.
Bhisey Brothers, Booksellers and Stationers, Silsilahi, Nagpur.
S. C. Talukdar, Proprietor, Students & Co., Cooch Behar.
Times of Ceylon Co., Ltd.
The Manager, Ceylon Observer, Colombo.
The Manager, The Indian Book Shop, Bangalore City.
B. C. Basak, Esq., Proprietor, Albert Library, Dacca.
The Srivilliputtur Co-operative Trading Union, Ltd., Srivilliputtur (Salem, S.R.).
Banwari Lal, Esq., Pakariya Street, Pilibhit, United Provinces.
The Manager, Educational Book Depôt, Jubbulpore.
Ragunath Prasad & Sons, Patna City.
Dandekar Brothers, Indore City.
The Hyderabad Book Depôt, Chaudhry, Hyderabad (Dacca).

List of Publications on Indian Entomology, 1925.

(Received for publication on 22nd April 1926.)

A

Aaron, S. F.—

Insect Parasites of Insects. (*Scientific American*, 184, Sept. 1925.)

What are the sounds that insects hear? (*Scientific American*, 390-1, June, 1925.)

Abbot, C. E.—Associative Memory in the Larvae of *Anax junius*. (*Ann. Ent. Soc. America*, XVIII, 533-536, Dec. 1925.)

Achard, J.—Catalogue des Scaphidiidae de la Faune palearectique. (*Bull. Soc. Ent. Belg.*, VI, 143-145, Jan. 1925.) [Key to genera, pp. 144-146.]

Adkin, Robert.—Dispersal of butterflies and other insects. (*Nature*; CXVI, 467, Sept. 1925.)

Adler, S., & Theodor, O.—

A Sporozoon of *Phlebotomus papatasi*. (*Ann. Trop. Med. & Parasit.*, XIX, 309-313, Sept. 1925.)

The experimental Transmission of Cutaneous Leishmaniasis to Man from *Phlebotomus papatasi*. (*Ann. Trop. Med. & Parasit.*, XIX, 365-371, Sept. 1925.)

Alberts, H. W., and Flint, W. P.—The effect upon the vitality of seed corn of temperature that will kill seed infesting insects. (*Jl. Eco. Ent.*, XVIII, 771-776, Dec. 1925.)

Aldrich, J. M.—

A New Tachinid Parasite of a Cocoon Moth in South Asia. (Diptera.) (*Proc. Ent. Soc. Wash.*, XXVII, 13, Jan. 1925.) [*Ptycho-myia remota*, n. sp., bred from the caterpillar of *Arana catexantha*, Hampson. attacking cocoanuts in the Federated Malay States.]

Aldrich, J. M.—*contd.*

Two New Species of the Tachinid genus *Lixophaga* with notes and key (Diptera). (*Proc. Ent. Soc. Wash.*, XXVII, 132-136. June 1925.)

Alexander, W. B.—Natural Enemies of Prickly Pear and their Introduction into Australia. (*Bull. No. 29, Inst. of Sc. & Ind. in Australia*, 1925.)

Alfken, J. D.—Zwei neue indische *Protopis*-Arten und über die 3 grossen indischen *Xylocopa* spp. (Apid). (*Ent. Mitteilungen*, XIV, 371-76, Oct. 1925.) [*X. latipes* Drury and *X. tenuiscapa* Westw. pp. 373-375, descriptive notes.]

Ali, S.—Citrus-psylla and how to control it? (*Punj. Agric. Dept. Seasonal Notes*, II, 30-31, Mar. 1925.)

Andrews, E. A.—The Thrips Pest of Tea in Darjeeling. (*The Indian Tea Association, Scientific Dept., Quarterly Journal*, Part II, 60-106, 1925.)

Andrews, E. A., and Tunstall, A. C.—Notes on the Spraying of Teal (*Indian Tea Assoc. [Rev. Edn.]*, 10 pls. 1925.)

Andrewes, H. E.—

A Revision of the Oriental Species of the Genus *Tachys*. (*Annali Museo Civico Storia Naturale*, LI, 327-498, tt. 3-4, 1923-25.) [General pp. 327-36; Keys pp. 336-337, 338, 340-43, 368-69, 374-75, 382, 387, 395, 400-08, 461, 463, 470-72, 485, 494; *Tachys latus*, n. sp., Burma: Carin Asciiui Checui, p. 339-340; *T. triangularis* Nietn *incertus*, n. var., Ceylon, p. 352; *T. opalescens*, n. sp., Ceylon, Negombo, pp. 352-53; *T. vilis*, n. sp., Kashmir, pp. 354-55; *T. sericeus*, n. sp., Burma, Borneo, pp. 362-63; *T. cardoni*, n. sp., Chota-Nagpur, pp. 364-65; *T. ochrias*, n. sp., Eastern Duars, Kumaon, Mussoorie, Dehra Dun, pp. 376-77; *T. brachys*, n. sp., Kumaon, Madras, Bengal, Malay States, pp. 377-78; *decolor*, n. var., Ceylon, p. 378; *T. bombycinus*, n. sp., Kumaon, Dehra Dun, Eastern Duars, Sikkim, pp. 385-86; *T. rhombophorus*, n. sp., *evanidus*, n. var. Eastern Duars, Sikkim, Kumaon, pp. 390-92; *T. dulcis*, n. sp., United Provinces, Bareilly, pp. 395-96; *T. castaneus*, n. sp., Sikkim, Kumaon, pp. 396-97; *T. aratus*, n. nom. (*T. sulcatus*, Motsch. nec. Putz), from Kumaon

Andrewes, H. E.—contd.

- to Northern Burma; *T. aratus*, Andrewes *virgatus*, n. var., Pusa, pp. 408-10; *T. belli*, n. sp., Sind, Karachi, pp. 411-12; *T. chalceus*, n. sp., Kumaon, pp. 415-16; *T. decoratus*, n. nom., for *T. ornatus* Nietn. nec. Apetz., Ceylon, p. 424; *T. ceylanicus* Nietn. *polyporus*, n. var., Kumaon, Dehra Dun, p. 437; *T. nalandæ*, n. sp., Ceylon, Nalanda, pp. 441-42; *T. malabaricus*, n. sp., Malabar, p. 443; *T. pallidicornis*, n. sp., Bombay, Khandesh, pp. 443-44; *T. taguz*, n. sp., Kumaon; Sikkim, pp. 444-45; *T. stevensi*, n. sp., Sikkim, Eastern Duars, Kumaon; Simla Hills; Kangra, pp. 445-46; *T. nilgircus*, n. sp., Madras, S. Mysore, p. 446; *T. nilgircus* Andrewes, var. *unisculptus*, n. var., Ceylon, pp. 446-47; *T. nannodes*, n. sp., Bombay, Madras, p. 447; *T. charactus*, n. sp., Kumaon; Burma, p. 451; *T. championi*, n. sp., Kumaon, Eastern Duars, Sikkim, pp. 453-54; *T. charis*, n. sp., Ceylon, Mysore, Madras, Chota Nagpur, Bombay, Central Provinces, Orissa, Bengal, pp. 451-55; *T. charis* Andrewes var. *rubescens*, n. var., Vizagapatam, p. 455; *T. comptus*, Andr., *borealis* n. var., Sikkim, Kumaon, Chota Nagpur, Formosa; *p'uripunctus*, n. var., Kumaon, pp. 461-63; *T. elegans*, n. sp., Madras, p. 465; *T. buzans*, n. sp., Madras, p. 476; *T. haliploides*, Bates *nigrinus*, n. var. Sikkim, Assam, Kumaon, pp. 479-80; *asthenes*, n. var., Kumaon, Simla Hills, Siwalik Hills, p. 480; *diversus*, n. var., Eastern Duars, p. 480; *T. saundersi*, n. sp., Malay States and Sikkim, pp. 482-83; *T. opacus*, n. sp., Bengal, p. 483-84; *bicolor*, n. var., Bengal, p. 484; *Limnastis levatus*, n. sp., Bengal, p. 497. Many previously recorded species from India redescribed and new species from other parts.]
- Papers on Oriental Carabidæ. XV. (*Ann. Mag. Nat. Hist.* XI, 306-13, Feb. 1925.) [*Nebria elegans*, n. sp., United Provinces, Kumaon, West Almora Division, Sunderdhunga, 8,000-12,000 ft.; *N. pindarica*, n. sp., United Provinces, Pindar Valley, 8,000-11,000 ft.; *N. camerani*, n. sp., United Provinces, Mussoorie, Dehra Dun, Siwalik Hills, West Almora. *N. aborana* n. sp., Assam, Naga Hills, 4,000 ft. Banks of Dihong River, Janakmukh, 600 ft.; *N. cinctella*, n. sp., United Provinces, Dehra Dun, Mothronwala; *Leistus nivium*, n. sp., Kashmir, Dusu.]
- Notes on Oriental Carabidæ. (*Ent. Mo. Mag.*, LXI, pp. 49-58, March 1925) [Genus *Asaphidion*; Key to spp., p. 50; *A. championi*, Andr., redesc., India: Kumaon, Spiti, Sikkim, Assam-Bhutan frontier, p. 52; *A. obscurum*, n. sp., Garhwal: Dudhatoli, pp. 52-53; *A. cuprascens*, n. sp., Kumaon, Ha'dwani Division

Andrewes, H. E.—*contd.*

Kaldhunga, p. 54; *A. griseum*, n. sp., Eastern Duars, p. 54; *A. viride*, n. sp., Sikkim: Dikchu in Tista Valley, p. 54-55; *A. indicum* Chaud. redesc. Punjab, Kumaon, Bengal, Sikkim, pp. 55-56; *A. substriatum*, n. sp., Kumaon: West Almora, pp. 56-57; *A. ornatum*, n. sp., Kumaon, p. 57].

Andrews, H. W.—Flies and Disease. (*Proc. S. London Ent. and Nat. Hist. Soc.*, 1924-25, 45-62, London, 1925).

Anonymous—

Report of the Administration of the Dept. of Agric., U. P., for the year ending 30th June 1925, pp. 30-32, 1925. [An account of work done at Cawnpore on *Platyedra gossypiella*.]

Report of the Operations of the Dept. of Agric. Madras, 1924-25. (Supdt., Govt. Press, Madras, 1925). [Entomology, pp. 22-23, 49.]

Annual Report of the Dept. of Agric. Bengal for the year 1923-24 (published 1925). [Entomology, Appendix I, IV-V; Sericulture, pp. 18-19.]

Report on the working of the Dept. of Agric. of the Central Provinces for the year 1924-25. [Entomology, pp. 19-20.]

Report on the operations of the Dept. of Agric. Burma, for the year ending 30th June 1925. Entomology, p. 17, Sericulture 18.]

A New Process of Preventing the Ravages of the clothes Moth (Lepid. Tineidæ). (*The Entomologist*, LVIII, 61-62, March 1925.) [Incorporation of Eulan into woolen textiles and other fabrics giving permanent protection against moth damage.]

Protecting wood against Termites. (*Indian Scientific Agriculturist*, 66-67, Feb. 1925.)

Catalogue of Scientific Papers, 1884-1900. Compiled by the Royal Society of London, Vol. XIX, T-Z.

Insect-Pests and Useful Insects. (*Review of Agricultural Operations in India*, 59, 1925.)

The Insect Menace. (Indian Med. Gaz., LX, 276-282, June 1925.) [Discussion on the subject by T. Bainbrigge Fletcher, pp. 276-277; S. K. Sen, pp. 277-279; Lt.-Col. S. R. Christophers, pp. 279-280; E. A. Andrews, pp. 280-281; J. T. Edwards, p. 281; A. Howard, pp. 281-282.]

Zoological Record, LX, 1923; LXI, 1924.

Repertoire des genres nouveaux et des especes nouvelles. (*Ann. de Parasitologie*, IV, 106-110, Jan. 1926.) [New species of parasitic insect described during 1925, 109-110.]

Anonymous—contd.

Proceedings of the Eleventh Meeting of the Anti-Malarial Advisory Commission, May 1925.

A New Cotton Pest. (*Syngnus rugifrons*, Badg.) (*Ent. Notes Series* No. 11, *Dept. Agric. Union of S. Africa*, Jan. 1925, and *J. Dept. Agric. Union of South Africa*, X, 11, Jan. 1925.) [Known for several years as an occasional pest of cotton in South and East Africa, has caused serious damage.]

Insect Powder Plant (*Pyrethrum cinerarifolium*. (*Jl. Dept. Agric. Union, S. Africa*, X, 338, April, 1925.)

Common Names of Insects approved for General use by the American Association of Economic Entomologist. (*Jl. Econ. Ent.* XVIII, 521-545, June 1925.)

Notifications regarding the Pest Act. E. II. and Lands Dept. No. 756, 24th June; No. 897, Agric., 24th July; No. 1493, Agric., 14th November; No. 1560 Agric., 26th November; No. 1561 Agric., 26th November; Govt. Bomb. Rev. Dept. No. 4388 24, 26th November.

Mosaic Disease. (*Journ Jamaica Agric. Soc.*, XXIX, 81, Kingston, February 1925.)

The Coffee Borer. (*Planters' Chronicle*, XX, 857-860, Nov. 1925.) [Resume of information.]

Stephanodores. (*The Planters' Chronicle*, XX, pp. 509-510, July 1925.) [Ravages of *Stephanodores coffea* in Brazil.]

Insects in Stored Grain. (*Science*, LXII, No. 1608, suppl. p. xii, Oct. 1925.)

Learning to Use Our Wings. (*Scientific American*, 273, Oct. 1925.) [In *Slipstream* is described the part played by airplane and dirigible against "Gypsy Moth."]

Arrow, G. J.—

A few new species of Melolonthine Coleoptera. (*Ann. Mag. Nat. Hist.*, XVI, 209-221, Aug. 1925.) (*Megistophylla dolichocera*, n. sp., Burma; Pakakko Hills, 6,500 ft., p. 216; *M. pentaphylla*, n. sp., Burma, S. Shan States; Loimwe, 5600 ft., p. 217.)

The Fauna of British India, *Coleoptera*, *Erotylidae*, *Languriidae* and *Endomychidae*, 416 pp., 76 fig., t. 1, March 1925. [Many n. spp.]

Austin, G. D.—Some Beetle Pests of Cucurbits in Ceylon. (*Year Book Dept. Agric. Ceylon*, 41-47, 2 pls., 1925.)

B

Babiy, P. P.—Neues zum Hummelpöbel. (*Zeit. Wiss. Zoo.*, CXXV, 502-512, June 1925.)

Back, E. A., and Cotton, R. T.—A newly recommended fumigant, ethyl acetate in combination with carbon tetrachloride. (*Jt. Econ. Ent.*, XVIII, 302-308, April 1925.)

Use of Vacuum for Insect Control. (*Jl. Agric. Res.*, XXXI, 1035-1041, Dec. 1925.)

Baker, C. F.—

Nomenclatorial Notes on the Jassoidea. (*Philipp. Jl. Sci.*, XXVII, iii, 159-160, May; iv, 537, Aug. 1925.)

Remarks on certain Indo-Malayan Fulgora, with special reference to Philippine species. (*Philipp. Jl. Sci.*, XVII, 343-64, tt. 1-16, Nov. 1925.) [Keys spp. 348-50, 356, 357, 359, 361.]

Baker, G. T. Bethune.—

A Revision of the Liphyrinae together with a description of the puparium of *Liphyra brassolis* and of the pupæ of *Aslanga vininga*, and *A. lamboni*. (Lepidoptera). (*Trans. Ent. Soc. Lond.*, 1924, 199-238, tt. 13-37, Feb. 1925.)

On the Scent-sacks in the genus *Rhodogastria* (Arctiinae). (*Trans. Ent. Soc. Lond.*, 1925, 321-328, pls. 37-42.)

Balachowsky, A.—Note sur deux prédateurs du *Parlatoria blanchardi*, Targ. et sur leur utilisation en vue de la lutte biologique contre ce Coccide. (*Bull. Soc. Hist. Nat., Afrique de Nord*, XVI, 161-172, t. 7, June 1925.)

Ballou, H. A.—

Insect Pest and Cotton Development. (*The Empire Cotton Growing Review*, II, 323-329, Oct. 1925.)

Some Relationships of Crop Plants to Insect Pests. (*The Planter's Chronicle*, XIX, 826-830, Dec. 1924.)

Ballard, E.—

Damage done to Cotton Seed by Plant Bugs. (*Queensland Agric. Jl.*, XXIV, pt. 2, 203-206, 3 pls., Aug. 1925.)

Fourth Entomological Progress Report (Australia). (*The Empire Cotton Growing Review*, II, 341-347, Oct. 1925.)

- Banniger, M.**—Neunter Beitrag zur kenntnis der Carabinae=die Nebruni. (*Ent. Mitteilungen*, XIV, 256-81, 329-343, July, October 1925.)
- Barber, G. W.**—The importance of winter mortality in the natural control of the European corn borer in New Zealand. (*Psyche*, XXXI, 279-92, Dec. 1924.)
- Barnes, M. E.**—The Toxic Action of Oil Films upon Mosquito Larvæ with particular reference to Pine Oil Films. (*Amer. Journ. Hygiene*, V, 315-329, May 1925.)
- Becker, Th.**—H. Sauter's Formosa-Ausbeute: Asilina III, (Dipt). (*Ent. Mitteilungen*, XIV, 62-85, Jan. 1925.) [Keys to genera, 63-69, 80-84.]
- Beeson, C. F. C.**—
On some Indian Brenthidæ (Coleoptera). Part II, Note on the Biology of the Brenthidæ. (*Indian Forest Records*, XI, 171-188, t. 3, 1925.) [Bionomics, food plants, etc., of spp.; list of trees with associated spp. of Brenthidæ].
The Teak Canker-grub (*Dihammus cervinus*). (*Ind. Forester*, LI, 187-192, 1 pl. May 1925.)
The Deodar defoliator. (*Ind. Forester*, LI, 565-572, t. 3, Nov. 1925.) [*Ectropis*, n. sp., Geometridæ.]
- Beeson, C. F. C., and Chatterjee, N. C.**—The Economic Importance and Control of the Sal Heartwood Borer. (*Hoplocerambyx spinicornis*, Newm., Fam. Cerambycidae.) [*Ind. Forest Records Ent. Ser.*, XI, 1-47, 1925.]
- Bell, T. R.**—The Common Butterflies of the Plains of India. Parts—*Hesperiidæ*, *Ismenainæ* and *Platingiinae*, *Pamphilinae*. XXXIII, XXXIV, XXXV. (*Jl. Bom. N. H. Soc.*, XXX, 285-305, 561-586, 822-837; Jan., June, Dec. 1925.) [Descriptions of various stages, and habits.]
- Bergroth, E.**—Notes on some Coreidæ (Hem. Het.). (*Konowia*, IV, 82-87 March 1925.) [*Hydarella*, n. g., 82-83, type *orientalis*, Dist., 83, Anuradhapura.]
- Berlese, A.**—Gli insetti, II, Fasc. 42-61, p. 849 to end of Vol. II, 1925.

- Bezzi, M.**—Some Tachinidae (Diptera) of Economic Importance from the Federated Malay States. (*Bull. Ent. Res.*, XVI, 113-123, Oct. 1925.) [Some new species.]
- Bischoff, W.**—Die Metamorphose der *Liponeura decipiens* var. *minor* n. var. (Blepharoceridae. Dipt.). (*Zool. Jahrbucher*, LI, 329-374, t. 3, figs. 1925.)* [Description, keys, bibliography.]
- Bishopp, F. C.**—Flytraps and their Operation. (*U. S. Dept. Agric. Farmers' Bull.* 734, 7 figs. July 1925.)
- Blair, K. G.**—A list of the Heteromorous Coleoptera collected mainly during the War by various Members of H. M. Forces in Mesopotamia. (*Jl. Bom. N. H. Soc.*, XXX, 428-440, 1925.)
- Blüthgen, P.**—Die Bienengattung *Nomioides* Schenck. (*Stett. Entom. Zeit.*, LXXXVI, 1-100, 1925.) [*N. incerta*, n. sp., pp. 22-24, Tenasserim; *N. feari*, Vachal, pp. 24-25, Attaran valley; *N. pusilla* n. sp., pp. 25-27, Deesa; *N. facilis* (sm.) (|| *Ceratina curvilineata*, Cam.) pp. 40-41, Lahore, Mooltan, Peshawar; *N. patruelis*, Ckll. pp. 41-42, Shevaroy; *N. dubia*, n. sp., pp. 42-44, Jubbulpore; *N. variegata*, var. *luderitzi*, n. var., pp. 54-56, Montgomery, Peshawar, Peshin, China etc.: *N. fasciata* var. *punjabensis*, Cam. pp. 61-64, Ferozepur, Karachi; *N. divisa*, (Cam.) (|| *Ceratina divisa*, Cam. || ? *Ceratina spilaspis*, Cam.), pp. 64-65, Raipur, Deesa; *N. cerea* (Nurse) (|| *Ceratina cerea*, Nurse), pp. 77-80, Deesa; *N. horni* (Strand) ♂ (|| *Halictus horni*, Strand), pp. 80-81, Matale (Ceylon); *N. kirachensis*, Cockerell, pp. 86-87, Karachi. Keys spp. pp. 90-98.]
- Bodenheimer, F. M.**—
On Predicting the Development Cycles of Insects. 1. *Ceratitis capitata*, Wied. (*Bull. Soc. R. Ent. Egypte*, 1924, 149-157, Cairo, 1925.)
Über die Voraussage der Generationenzahl von Insekten II. Die Temperaturentwicklungskurve bei medizinisch wichtigen Insekten. (*Zentralbl. Bakt.* I, Abs. XCIII, 1924.)
- Bodine, J. H.**—
Physiology of the Orthoptera. (*Bio. Bull.*, XLVIII, 79-82, Feb. 1925.) [Hydrogen Ion Concentration of the blood and alimentary tract of certain Orthoptera.]

Bodine, J. H.—*contd.*

Effect of temperature on rate of embryonic development of certain Orthoptera. (*Jl. Exp. Zoo.*, XLII, 91-109, 1925.)

Brauer, A.—Studies on the Embryology of *Bruchus quadrimaculatus*. Fabr. (*Ann. Ent. Soc. America*, XVIII, 283-312, tt. 13-19, Sep. 1925.)

Breitenbecker, J. K.—An Apterous mutation in *Bruchus*. (*Biol. Bull.*, XLVIII, 166-170, March 1925.)

Bristove, W. S.—Sound production by Insects. (*Nature*, CXV, 640-41, May 1925.)

Brocher, F.—L'appareil buccal des larves de *Psylla pyrisuga*. Etude anatomique et physiologique. (*Ann. Soc. Ent. France*, XCIV, 55-56, figs. March 1925.)

Brumpt, E.—Ponte et résistance des œufs de l' *Anopheles maculipennis*. (*Ann. Parasit. Hum. and Comp.*, III, 396-402, 3 figs. Oct. 1925.)

Brunetti, E.—Some notes on Indian Syrphidæ, Conopidæ and Oestridæ. (*Rec. Ind. Mus.* XXVII, 75-79, March 1925.) [Many already described spp.]

Bunker, C. W. O., and Hirschfelder, A. D.—Mosquito Repellents. (*Amer. Journ. Trop. Med.*, V, 359-383, Sep. 1925.)

Burkill, I. H.—Insect Vision in connection with Flower Fertilization (*Singapore Naturalist*, 22-46, Jan. 1925.)

Burroughs, A. M.—What Lubricating Oil promises as a Spray. (*Better fruit*, XIX, 11, 43, 12-13 and 19-20, 12-13, Feb.-April 1925.)

Buxton P. A., and Hopkins, C. H. E.—Race suicide in *Stegomyia*. (*Bull. Ent. Res.*, XVI, 151-153, Oct. 1925.) [Attraction to various hay infusions.]

C

Caldwell, G. T.—A Reconnaissance of the Relation Between Desiccation and CO₂ Production in Animals. (*Biol. Bull.*, XLVIII, 259-272, April 1925.)

Cameron, A. E.—

Soil Insects. (*Science Progress*, 92-108, July 1925.)

Studies on the Bionomics of Mange Mites of Cattle. (*Parasitology*, XVII, 278-283, Aug. 1925.)

Cameron, J.—Eradication of the Cockroach (*Periplaneta* sp.). (*China Inf. Jl.* Shanghai, XXXIX, 458-461, May 1925.) [Commercial finely powdered sodium fluoride 4 part, and boric acid powder 1 part, sprinkled on the floor and junctions of walls and floor.] (*Abst. R. A. E., A*, p. 120, 1925.)

Cameron, M.—Catalogue of Indian Insects, Part 6—Staphylinidæ, Calcutta, 1925.

Carpentier, F.—Sur le double stigmate de quelques Orthopteres. (*Bull. Soc. Ent. Belg.* VI, 123-140, figs. Jan. 1925.)

Carter, H. F.—The Anopheline Mosquitoes of Ceylon. Part I. The Differential Characters of the Adults and Larvæ. (*Ceylon Journ. Sci. Sec. D., Med. Sci.*, I, 57-97, 7 pls., 11 figs., Colombo, April 1925.)

Carter, W.—The effect of low temperature on *Bruchus obtectus*, Say., an insect effecting seed. (*Jl. Agric. Res.*, XXXI, 165-182, July 1925.)

Catheart, C. S., and Willis, R. L.—Analyses of Materials sold as Insecticides and Fungicides during 1924. (*New Jersey Agric. Expt. Sta. Bull.* 407, New Brunswick, N. J., Nov. 1924.)

Chamberlin, J. C.—Supplement to a monograph of the *Lacciferidæ* (*Tachardiinæ*) or Lac insects (Homopt., Coccidæ). (*Bull. Ent. Res.*, XVI, 31-44, fig. 1, July 1925.) [Criticism of S. Mahdihassan's classification from a physiological stand point; *Lacciferinæ*, n. sub. fam.; *Lacciferini*, n. tribe; *Lacciferi*, n. sub-tribe; Key, *Laccifer* spp., 33, *Laccifer javanus*, n. sp. Java: Buitenzorg, op Ficus; *L. rangoonensis*, n. sp., India: Rangoon, from *Quisqualis*. Undetermined and questionable spp. *L. nagoliensis* (Mahdihassan), *L. sindica* (Mahdihassan), *L. mysorensis* (Mahdihassan), *L. communis* (Mahdihassan), *L. chinensis* (Mahdihassan). Sub-tribe *Tachardielli* nov. (includes *Tachardiella*, *Austrotachardiella*). Tribe *Austrotachardiini*, nov. Subfamily—*Tachardininæ*, nov. Doubtful spp. *Tachardina silvestirii* (Mahdihassan).]

Champion, G. C.—

"*Phalacrus*" *confectus*, Walk., and its Southern allies (Fam. Anisotomidae). (*Ent. Mo. Mag.* LXI, 6-11. figs.; Jan. 1925.) [*Cyrtusa confecta*, Wlk., 7-8, fig. 1, redescr., Dikoya].
 Studies in Phalacridæ, II. Asiatic and Tropical American Forms (Coleoptera). (*Ann. Mag. Nat. Hist.*, n. s., XVI, 601-621, Dec. 1925). [*Phalacrus immarginatus*, n. sp., India: Dhaulī, Kumaon, p. 604; *Litotarsus anisotomoides*, n. sp., Burma, Momeit, p. 616-17.]

Chandler, A. C.—The Transmission and Etiology of Dengue—A. Critical Review. (*Ind. Med. Gaz.*, LX, 460-62, Oct. 1925.)

Chandler, S. C.—How soon after spraying with oil may scale control results be safely scored? (*Jl. Eco. Ent.*, XVIII, 553-554, June 1925.)

Charrier, H.—Action des huiles et du pétrole sur les larves de moustiques. (*C. R. Soc. Biol.*, XCII, 1280-1281, Paris, 15th May 1925.)

Cheales, E. R. S.—The Sudan Boll Worm a Serious Pest. (*Colton News Wkly.*, II, 343 and 446-447, 1925.)

China, W. E.—The Hemiptera collected by Professor J. W. Gregory's Expedition to Yunnan, with Synonymic Notes on Allied species. (*Ann. Mag. Nat. Hist.* XVI, 449-485, figs., Nov. 1925.) [Many species typical of Transgangeitic sub-region-Himalayas. Assam N. Burma, Siam, Tonkin. Pentatominae: Tribe Halyaria *Tachengia*, n. gen.; *T. ussura*, n. sp. Tacheng, 7,300 ft., p. 451-52; *Erthesina illia*, n. sp., Shih-ku, Tacheng, 7,300 ft. p. 452-53; *Eurydema lituriferum*, var. *yunnanensis*, nov. Wei-si River, 6,200-7,700 ft., p. 454, Tessaratominæ: *Eusthenes philoctetes*, n. sp., Mekong River, 6,200 ft., N. of Yei-chib. 6,400 ft., p. 455-56; Urostylidæ: *Urostylis agna*, n. sp., S. E. of Atuntze, 12,000 ft., p. 457-58; Lygaeinae: *Emphanisus*, n. gen.; *E. cuprea*, n. sp., Feng-mung-Kai, p. 460-63; Reduviinae: *Reduvius gregoryi*, n. sp., between Gadsye and Beta, 7,000 ft., p. 464-65; *Brachytonus*, n. gen.; *B. bicolor*, n. sp. Yunnan, p. 465-67; Nabinae: *Nabis (Aptus) dis*, n. sp., Jugeh River, 7,000-9,500 ft., p. 467-69; Homoptera, Gæuinæ: *Cicadutra gregoryi*, n. sp. Yunnan, (resembles closely *Quintilia penniponta*

China, W. E.—contd.

Dist. N. India, p. 471-72; *Lyurgus*, n. gen. for *Quintilia subtrita*, Wlk., p. 472; *Cicadatra shaluensis*, n. sp., Shalu, 9,300 ft., p. 472-73; *Hyalessa*, n. gen.; *H. ronshana*, n. sp. near Ronsha 7,200 ft., pp. 474-75; Sub-family Fulgoroidea: Fam. Flatidae: *Cerynia parnassoides*, n. sp. Gadsze on the Yangtze-Kiang, 6,600 ft., pp. 476-78; *Ph. omnia melichari*, China, n. nov. for *P. inornata*, Melnes Walk. Mekung River near Sha-watson, 6,200 ft. Lower Wei-si Road, Yung-lung-Chow, 5,300 ft., p. 478-9; Fam. Eurybroachydidae: *Nisis terezis*, n. sp., Choong-tang, p. 479; Fam. Delphacidae, *Nilaparvata muii*, n. sp., Chungso, 7,200 ft., p. 480; Fam. Membracidae, Sub-fam. Centrotinae: *Tetragona scutellata*, n. sp., S. E. of Atuntze, 12,000 ft., p. 480-81; Fam. Cercopidae, Sub-fam. Aphrophorinae, *Yunnan*, n. g.; *Y. v. ra*, n. sp., Valley west of Tsa-si-la pp. 481-83; Fam. Jassidae (Cicadellidae), Sub-fam. Cicadellinae: *Omi. oxis*, n. g.; *O. kariana* n. sp. Kari, 9,800 ft., p. 483 f5.]

Chopard, L.—The Gryllidae of Ceylon in the British Museum Collections.

(Ann. Mag. Nat. Hist. XV, 505-56, figs. May 1925.) [*Anurogryllus tenellus*, Wlk., p. 508-09, red ser.; *Gryllus pallipes*, sp. n., Peradeniya, p. 510; *Itaropsi* (g. n.) *parvipes*, Wlk., Kandy, Peradeniya, Ratnapura, p. 510; *Gryll. de greeni*, sp. n., fig. 5, (no exact locality), p. 511-13; *Nemobiodes laeviceps*, sp. n., (no exact locality), p. 13; *N. nigrocephalus*, sp. n., Peradeniya, p. 514-15; *Landreva subaptera*, sp. n. Namunakula, 6,600 ft., p. 517-19; *Liphoplus ceylonicus*, sp. n., Peradeniya, p. 519-20; *Cycloptiloides ceylonicus*, sp. n., Peradeniya, p. 520-21; *Luzaropsis* (g. n.) *ferruginea*, sp. n., Kandy, pp. 521-22; *Homalogryllus* (g. n.) *depressus* sp. n. Trincomalee, p. 523-25; *Metioche unicolor*, sp. n., Peradeniya, Batavia, p. 526-27; *Paranazipha* (g. n.) *ornatipes*, sp. n., Kandy, pp. 528-30; *Anaxipha pubescens*, sp. n., Peradeniya, p. 530-31; *Cyrtoxipha greeni*, sp. n. Peradeniya, p. 532-33; *Madusumma greeni*, sp. n. Kandy, p. 533-35.]

Chopra B.—Note on a Nest of the common Indian Hornet—*Vespa cincta* Fabr. (Jl. Bom. Nat. Hist. Soc., XXX, 858-60, 1, t. Dec. 1925.)**Choudhury, M. C.—The defoliation of Gamhar (*Gmelina arborea*) in the Chittagong Hill Tracts, Bengal. (The Indian Forester, LI, pp. 57-60, (Feb. 1925.) [The insect responsible for the damage is *Calopecta teayana*, Latr. Fam. Chrysomelidae.]**

Christophers, S. R.—

Man, Anopheles and the Malaria parasite in relation to the Fauna, s.
(*Ind. Med. Gaz.*, 279-280; June 1925.)

Indian Kala Azar Commission. (*Nature*, CXV, 421-422, 1925.)

Provisional list and reference catalogue of the Anophelini. (*Indian Medical Research Memoir*, No. 3, Dec. 1924.)

Christophers, S. R., Shortt, H. E., and Barraud, P. J.—

The development of the Parasite of Indian Kala Azar in the Sandfly,
Phlebotomus argentipes, Annandale and Brunetti (*Ind. Journ. Med. Res.*, XII, 605-607, Jan. 1925.)

Further observations on the Feeding of Sandflies, *Phlebotomus argentipes*, on cases of Indian Kala Azar. (*Ind. Journ. Med. Res.*, XIII, 159-165, July 1925.)

Culicoides and Kala-azar in Assam. (*Ind. Journ. Med. Res.*, XIII, 175-176, July 1925.)

Cleveland, L. R.—

The feeding habit of Termite castes and its relation to their intestinal flagellates. (*Bio. Bull.*, XLVIII, 295-308, May 1925.)

The effects of oxygenation and starvation on the symbiosis between the termites, *Termopsis*, and its intestinal flagellates. (*Ibid.* 309-26.)

Toxity of Oxygen for Protozoa in vivo and in vitro; Animals De-faunated without Injury. (*Bio. Bull.*, XLVIII, 455-468 June 1925.)

Cockerell, T. D. A.—Descriptions and Records of Bees, CIV. (*Ann.-Mag. Nat. Hist.* (9), XV, 489-96; April 1925.) [*Halictus lucipennis*, Smith, p. 495, N. India, note; *Andrena torrida*, Smith, from India, is a *Nomia*, p. 495. *Aglaopis brevipennis*, Cam., is a *Diorys*, p. 496.]

Colcord, M.—Index III to the Literature of American Economic Entomology, 1920 to 1924. (*Amer. Assoc. Econ. Ent. Spec. Publ.* 3, X, 1925.)

Coleman, L. C.—The Coffee Borer; How to combat it? (*The Planter's Chronicle*, XX, 842, Nov. 1924.)

Collet.—Un procede de destruction des mouches adultes. (*Bul. Soc. Medico-Chirurgicale*, 1924, June 1925.)

- Cook, William C.**—The Distribution of the Alfalfa Weevil (*Phytonomus posticus*, Gyll. A study in Physical Ecology.) (*Jl. Exp. Res.*, XXX, 47-491, March 1925.) [Discussion of influence of climatic factors on distribution.]
- Corti, A.**—Studien über die Gattung *Agrotis* O. (Lep.) IV. *A. canera*. Schiff., *A. septentrionalis*, Möschl. und *A. turatii* Stäfs. (*Ent. Mitteilungen*, XIV, 212-33, t. 1, figs. 12 July 1925.)
- Cotte, J., and Tian, A.**—Observations sur le métabolisme de la Mouche domestique (*Musca domestica* L.). (*Sec. Bül. L'évén. plénière* 1924, 193-196, 1 fig. 1924.)
- Couston, F.**—La tetrachlore de carbons pour la destruction des Charançons. (*Jl. Agric. Prat.*, XLIII, 477-478, June 1925.)
- Cragg, F. W.**—Observation on the Reproductive System of *Cimer*: Impregnation. (*Ind. Jl. Med. Res.*, XII, 451-455, 1925.)
- Crampton, G. C.**—
 A Phylogenetic Study of the Thoracic Sclerites of the Non-Tipuloid Nematocerous Diptera. (*Ann. Ent. Soc. America*, XVIII, 49-74, tt. 3-7, Mar. 1925.)
 Phylogenetic study of the labium of holometabolous insects, with particular reference to the Diptera. (*Proc. Ent. Soc. Washington*, XXVII, 68-90, tt. 6-8, April 1925.)
 The external anatomy of the Head and Abdomen of the Roach, *Periplaneta americana*. (*Psyche*, XXXII, 195-226, pl. VII, Aug.-Oct. 1925.)
 Evidence of Relationship indicated by the Thoracic Sclerites of certain Eriopterine Tipuloid Diptera. (*Ins. Insc. Mens.*, XIII, 197-213, pl. II, III, Oct.-Dec. 1925.)
- Criddle, N.**—Lessons from the Grasshopper outbreak of 1919-23 in Manitoba. (*55th Annual Report, Ent. Soc. Ontario* (1924), 13-16, 1925.)
- Crossman, S. S.**—Two Imported Egg Parasites of the Gipsy Moth, *Anastatus bifasciatus*, Fosc. and *Schedius kuvanae*, Howard. (*Journ. Agric. Res.*, XXX, 643-675, figs. April 1925.) [Life-history, technique of breeding, etc., apparatus used.]

Cunningham, J. and Pundit, S. R.—A New Endemic Focus of Kala-Azar in Southern India. (*Indian Journ. Med. Res.*, XII, 743-753, 3 maps, 1 pl., April 1925.)

Cutler, J. V., Theron, J. J., and Oosthuizen, J. du P.—Some further Remarks on Tobacco cultivation for Nicotine. (*Union S. Africa Dept. Agric. Bull.* No. 2 of 1925, 12 tables.)

D

Dalla Torre, C. G.—Aphaniptera orbis terrarum (Synopsis præcursoria) (*Ber. naturw. med. Vereines Innsbruck*, XXXIX, 1924.)

Dani, P. G.—Economic Way of Controlling the Pomegranate caterpillar. (*Viracholo isocrates*) (*Poona Agric. Coll. Magz.*, XVI, 234-236, Feb. 1925.) [Use of paper bags recommended.]

Desbordes, H.—Description d'un genre nouveau et d'une espèce nouvelle d'Histérides (Col.). (*Bull. Soc. Ent. France*, 162-3, Mai 1925.) [*Spatochinus*, n. gen., *S. termitophilus*, n. sp., Dehra Dun.]

Dieuzeide, P. R.—Les Champignons entomophytes, du genre *Beauveria* Vuillemin. Contribution à l'étude de *Beauveria effusa*, Vuill. parasite du *Doryphore*. (*Ann. Epiphyties*, XI, 185-219, pl. 1, May-June 1925.)

Dixey, F. A.—Pupation of *Catopsilia crocale*, Cram. (*Proc. Ent. Soc. Lond.*, 1924, pp. LXXXIV-LXXXVI; Feb. 1925.)

Doane, R. W.—Scientific Names of Economic Insects. (*Jl. Econ. Ent.*, XVIII, 158-162, Feb. 1925.)

Dodds, G. S.—Ecological studies of aquatic insects. Adaptations of caddisfly larvæ to swift streams. (*Ecology*, VI, 123-137, 1925.)

D'Orchymont, A.—

Hydrophilides des Iles Philippines. (*Bull. Ann. Soc. Ent. Belgique*, LXV, 200-202, June 1925.) [*Berosus* (*Eunoplurus*) *bowringi*, n. sp., India, Fenapore pres de Dacca. p. 168.]

D'Orchymont, A.—*contd.*

Contribution a l'etude des Hydrophilides III. (*Bull. Ann. Soc. Ent. Belgique*, LXV, 261-295, August 1925.) [*Ochthebius* (*Homa-lochthebius*) *yunnanensis*, n. sp., Yunnan, p. 263-265; *Ochthebius* (*Hymenodes*) *opacipennis*, Champ., N. India, p. 266; *Coclostana horni*, Regt., Ceylon, Nicobars, Andamans, p. 267; *C. simulans*, n. sp., Mont Matang (W. Sarawak), p. 268; *C. vitalis*, d'Orch. Indo-China, Singapore, India (Bengal, Barway, Calcutta) Sumatra, Java, Borneo, p. 269; *Dactylosternum abdorminale*, Fb., Ceylon, India, Andamans; p. 275; *Cercyon* (s. str.) *crenulatus*, Regt., India; Nilgiri hills, p. 276; *C. (s. str.) lunulatus*, G. & H., Ceylon, Sumatra, Tonkin, p. 277; *Gillissius*, n. g., *madurensis* n. sp., India: Shembaganur, p. 287-288.]

Dover, C.—

Synonymie und neue Fundorte der Braconiden Indiens. (Hym.) (*Ent. Mitteilungen*, XIV, 39-40, Jan. 1925.)

Notes on some Indian Bees in the British Museum. (*Ann. Mag. Nat. Hist.* (9) XV, 219-234; Feb. 1925). [*Tetralonia krishna*, sp. n., p. 227, Quetta; *T. pitomasa*, sp. n., pp. 227-228, Peshin, Beluchistan; Quetta; *T. pitrakha*, sp. n., pp. 228-229, Quetta; *Heriades binghami*, n.n., for *H. parvula*, Bingh.; *Anthidium sylvaticum*, sp. n., p. 233, Simla; Some well-known Palearctic forms new to the Indian region and some notes on synonymy have also been included.]

Further Notes on the Indian Diplopterous Wasps. (*Journ. and Proceed. Asiatic Soc. Bengal*, n. s. XX, 289-305, figs. (1924) (1925.) [Vespidæ: Masaridinæ, *Celonites nursei*, n. sp., Quetta, 289-290; Eumeninæ, *Eumenes comberi*, n. sp., Karachi, Shapali, 293-294; *Odynerus sculpturatus* n. sp., Karachi, 300-301; Polistinae, *Vespa minuta*, n. sp., Tenasserim, 304-305.]

Brenowski, A. K.—Eine neue Methode der Henschreckenbekämpfung in Bulgarien. (*Zeit. Ange. Entom.*, XI, 452-455, 1 fig. Dec. 1925.) [Hand nets used.]

Dustan, Alan G.—A study of the Methods used in growing Entomophthoroid Fungi in cages prior to their Artificial Dissemination in the Orchards. (55th Annual Report, *Ent. Soc. Ontario*, 1924, 63-67, 1925).

Dutt, G. R.—The Giant Mealy Bug and its Controls. (*Bull. Ent. Res.*, XVI, 155-158, pl. IX-XI, Oct. 1925.)

- Dyar, H. G., and Shannan, R. C.—The types of Philippine mosquitos described by Ludlow and other notes on the fauna. (*Ins. Inst. Mens.*, XIII, 66-89, April-June 1925.)

E

- Ebner, R.—Biologische Beobachtungen an *Pycnogaster bolivari* Br.—W. (Orthoptera). (*Zeit. Wiss. Zoo.*, CXXV, 357-363, figs. 4, June 1925.)
- Edwards, F. W.—British Fungus-Gnats (Diptera, Mycetophilidae). With a revised Generic classification of the Family. (*Trans. Ent. Soc. London*, 1924, 505-670, tt. 49-61, Feb. 1925.)
- Efflatoun, Hassan C.—Egyptian Diptera, a Monograph of Family Trypanidae. (*Mem. Soc. Royal. Ent. Egypte*, 132 pp. 5 tt. 1925.)
- Eidam, P.—Beitrag zur Kenntnis einiger Caraben (Col.). (*Deutsch. Ent. Zeit.*, 333-334, Jan. 1925.) [*Cychrus rostratus depressus*, var. nov., Baïta, Bihar.]
- Ellis, William, O.—Some Lepidopterous Larvæ Resembling the European Corn borer. (*Jour. Agric. Res.*, XXX, 777-792, pls. 2, Key: April 1925.)
- Elmer, O. H.—Transmissibility and Pathological Effects of the Mosaic Disease. (*Iowa Agric. Expt. Sta. Res. Bull.* 82, 39-91, 2 figs. Feb. 1925.)
- Eltringham, H.—
 On the Abdominal Brushes in certain male Noctuid Moths. (*Trans. Ent. Soc. London*, 1-5, t. 1, Aug. 1925.)
 On a new Organ in certain Lepidoptera. (*Trans. Ent. Soc. London* 7-10, t. 2, Aug. 1925.)
 On the Source of the Sphragidial Fluid in *Parnassius apollo* (Lepidoptera). (*Trans. Ent. Soc. Lond.* 11-14, t. 3, Aug. 1925.)
 On the Abdominal Glands in *Heliconius* (Lepidoptera). (*Trans. Ent. Soc. London*, 269-275, t. 33, Aug. 1925.)
 On the Structure of the ocelli in *Plusia gamma* (Lepidoptera) (*Trans. Ent. Soc. London*, pp. 277-279, t. 34, Aug. 1925.)

Emden, F. Van.—Zur Kenntnis der Bizähne der Arthropoden, insbesondere der Coleopteren. (*Zeit. Wissen. Zoo.*, CXXVI, 622-654, figs. Dec. 1925.) [Bibliography, 649-654.]

Emery, C.—Sub-fam. Formicinae, Fam. Formicidae, Hymenoptera. (*Genera Insect.* Fasc. 183, 302 pp., 4 tt., 1925.)

Enderlein, G.—

Zur Klassifikation der Tabaniden, Eine Berichtigung (*Zoo. Anz.*, LXII, 180-181, March 1925.)

Beiträge zur Kenntnis der Copeograthe IX. (*Konowia*, IV, 97-113, July 1925.) [Psocidae, Psocinae, *Euchismia* nov. gen. *E. cubitalis* (Enderl. 1912), Indien; *E. cinerea* (Enderl. 1903), Indien; *E. oblusa* (Hag. 1858), Ceylon; 99-100.]

Engel, E. O.—Über Rutilidae sensu lat. [Dipt]. (*Zoo. Jahr.*, L, 339-376, 1925.) [Key to genera and species.]

English, L. L.—A Preliminary Report on the Preparation of Insecticide Emulsions with a Colloidal clay. (*Journ. Econ. Ent.*, XVIII, 513-515, June 1925.) [Use of bentonite, a colloidal clay, as an emulsifier for kerosene, red engine oil, paraffin oil and furfural.]

Esaki, T.—

Über die Mimese der Kallima-Arten (Lepidoptera, Nymphalidae) (*Zeit. Wiss. Ins. Biol.*, XX, 110, June 1925.)

New or Little-known Water Striders from the Oriental Region. (*Phil. Journ. Sc.*, XXVI, 57-64, tt. 1-2, Jan. 1925.) [*Metrocoris brevis*, Mayr., Ceylon, Formosa, 61-2, t. 2, f. 18, 19.]

Evans, A. M.—A New Variety of *Anopheles marshalli*, from Sierra Leone. (*Ann. Trop. Med. Parasitology*, XIX, 461-2, pl. VIII, Dec. 1925) [*Anopheles marshalli* var. *freetownensis*, n. var.]

Evans, H. H.—Oil Sprays in Pest Control. (*Agric. Journ. Dept. Agric. Br. Columbia*, X, 4-5, 19, 2 pls. March 1925.)

Evans, W. H.—The Identification of Indian Butterflies, Parts VI, VII, VIII. (*Journ. Bombay N. H. Soc.*, XXX, 322-351, 610-639, 756-776, tt. 26, 27, 28, 29, Jan. June, Dec. 1925.) [Some new names.]

Eveinus, Joachim.—Die Entwicklung des Zwischendramas der Honigbiene (*Apis mellifica*, L.). (*Zoo. Ang.* LXIII, pp. 49-64, fig. 7, June 1925.)

Ewing, H. E.—

On the Taxonomy, Biology and Distribution of the Biting Lice of the Family Gyropidae. (*Proc. U. S. Natl. Mus.*, LXIII, Art. 20, pp. 1-42, 18 figs., t. 1; March 1924.) [*Gyropus ovalis*, Nitzsch, pp. 13-15, f. 6, on *Cavia cobaya*; *Gliricola porcelli*, Linn., pp. 33-34, ff. 15, 17, t. 1, f. 8, on *Cavia cobaya*.]

Sulphur-impregnated clothing to protect against Chiggers. (*Jl. Eco. Ent.*, XVIII, 827-829, pl. 7, Dec. 1925.)

F

Fahringer, J.—Opuscula braconologia, (Published by Fritz. Wagner, Wien. Lief. 1, 60 pp., 1 pl. 1925.)

Fawcett, G. L.—Elmosaico o enfermedad de las rayas amarillas de la Cana. (*Rev. Indus. Agric. Tucuman*, XV, 103-111, 1925.) (Abstract in *Rev. App. Mycol.*, IV, 378, June 1925.) [The Disease appears to be transmitted by *Aphis maidis* only. Experiments with Jassids gave negative results. *R.A.E.A.*]

Felt, E. P.—The dissemination of insects by Air Currents. (*Jl. Ec. Ent.*, XVIII, 152-156; Feb. 1925.)

Ferguson, D. B.—Fumigation of Citrus Trees. Notes on Recent Developments in California, (*Agric. Gaz. N. S. W.*, XXXVI, 6, pp. 437-443, figs. June 1925).

Ferriere, Ch., and Faure, J. C.—Contribution a l'étude des Chalcidiens parasites de *l'Apanteles glomeratus*, L. (*Ann. Epiphyties*, XI, 221-34, figs. July-Aug. 1925.)

Ferris, G. F.—Third and Fourth Report upon Diptera Pupipara from the Philippine Islands. (*Philippine Journ. Science*, XXVII, 413-420, July, XXVIII, 329-341, Nov. 1925.)

Ferris, G. F. and Myees, L. E.—The Generic Types of the Diaspidæ (Hemiptera). (*Bull. Ent. Res.*, XVI, 163-167, t. 12-13, Oct. 1925.)

Feuerborn, H. J.—Das Problem der segmentalen Gliederung des Insektenthorax. 3. Beitrag. Eine Erwiderung auf E. Martinis und H. Webers Kritik. (*Zool. Anz.*, LXII, 1-26 Figs, 2, Jan. 1925.) 4. Beitrag. Das Grundschemata des Pterygotenthorax, Hermann Weber's und sein Aufbau. (*Zool. Anz.*, LXIII, 169-182, July 1925.) 5. Beitrag. Die neue Deutung des Pterygotenthorax. (*Zool. Anz.*, LXIII, 273-292, Aug. 1925.) 6. Beitrag. Der Thorax der Apterygoten und Myriapoden. Zugleich ein Ausblick zu den Arachnoideen. (*Zool. Anz.*, LXIV, 29-50, Figs. 11, Sept. 1925.)

Fink, D. E.—Physiological studies on Hibernation in the Potato Beetle, *Leptinotarsa decemlineata*, Say. (*Biol. Bull.*, XLIX, 381-406, Nov. 1925.)

Fletcher, T. Bainbrigge -

Report of the Imperial Entomologist. (*Sci. Repts. Agric. Res. Inst., Pusa*, 1923-24, 52-60 March 1925.)

Catalogue of Indian Insects, Parts 7, Lasiocampidae, 8, Syntomidae, 9, Zygenidae, Calcutta, 1925.

The Importance of Entomology to India (*Indian Med. Gaz.*, 276-277, June 1925.)

Migration: a factor in pest-outbreaks. (*B. H. Ent. Res.*, XVI, 177-181, Oct. 1925.)

Tentative key to the Orders and Families of Indian Insects. (*Bull.* 162, *Agric. Res. Inst. Pusa*, 1925.)

List of Publications on Indian Entomology, 1924, (*Bull.* No. 161, *Agric. Res. Inst., Pusa*, 1925).

Forbes, William, T. M.---

The Lepidoptera of New York and neighbouring States. (*Mem.* 68, *Cornell University, Agric. Expt. Sta.* June 1923.) [Keys to families based on the characters of adults, pupæ and larvae, many diagrams and setal charts.]

The Hypothetical Wing of the Hymenoptera. (*Annals, Ent. Soc. America*, XVIII, 22-30, pt. 1-2 March 1925.)

The Second Alder-miner Pupa in the Higher Coleoptera. (*Psyche*, XXXII, 20-21, 21 fig. Dec. 1925.)

Formánek, R.—Neue Curculioniden des paläarktischen Gebietes. (*Wien. Ent. Zeit.* XLII, 18-28, April 1925.) (*Otiorrhynchus kashmirensis*, n. sp., Pir Panja, Kashmir, p. 19; *Mylocerops splendens*, n. sp., Manili, Kulu, Kashmir, p. 22-23.)

Fraser, F. C.—

Indian Dragonflies. Parts XX, XXI, XXII, (*Journ. Bombay N. H. Soc.*, XXX, 397-405, figs., 1t.; Jan.; 657-663, figs., 1t., June; 846-857, figs., 1t., Dec. 1925.) [Following species have been redescribed: *Stylogomphus inglisi*, Fras., Tista river, Darjeeling District, p. 397-9; *Ophigomphus relictus*, Calv., Gulmarg, Kashmir, p. 399-402; *Indogomphus longistigma*, Fras., Nilgiri Wynaad, Coorg, p. 402-3; *Indogomphus martin*, Fras., Hasimara Tea Estate, Duars, Bengal, Shillong, Assam, p. 403-4; *Indogomphus cerastes*, Selys., Nepal and North India, p. 401-5; *Gomphus personatus*, Selys., Khasia hills, Shillong, p. 658-60; *Gomphus nilgiriensis*, Laid, Mettapalayam and Gudalur ghats, Nilgiris, Sampaji and Hatti river banks, Coorg, Bear and Cinchona streams, Kodaikanal, Palni Hills, p. 660-61; *Gomphus o'doneli* Fras., Hasimara Tea Estate, Duars, Bengal, p. 662-63. *Helicogomphus walli*, n. sp., Ceylon, p. 849-50; *H. selysi*, n. sp., Burma, Assam, p. 850; *Microgomphus burmicus*, n. sp., Upper Burma, p. 854-855, fig; *Microgomphus lilliputensis*, n. sp., Lower Burma, p. 855-56, fig. Many spp. redesc.]

The true position of the genera *Orogomphus* and *Chlorogomphus* as demonstrated by a study of the larva of *O. atkinsoni* and *O. campioni* and by a comparison of the latter with the larva of *Anotogaster nipalensis* (Odonata). (*Rec. Ind. Mus.*, XXVIII, 423-429, figs. 2 pls. Sep. 1925.)

Freeborn, S. B., Regan, Wm. M., and Folger, A. H.—The relation of flies and fly sprays to milk production. (*Jl. Eco. Ent.*, XVIII, 779-790, Dec. 1925.)

Friederichs, K.—Der Kaffeebeerenkäfer in Niederländisch-Indien. (*Zeit. angw. Entom.*, XI, 325-85, figs. Dec. 1925.) [*Stephanoderes hampei*, Ferr., a very full account of the pest, parasites, environmental factors, control, etc., and bibliography.]

Frise, H.—Neue Formen von Schmarotzerbienen, besonders aus dem paläarktischen Gebiet. (*Konowia*, IV, 27-42, March 1925.) (*Coelioxys decipiens*, Spin., p. 31, Europe, Egypt, Turkestan Kashmir; *C. indica*, n. sp., pp. 32-33, Deesa.)

Frison, T. H.—Intestinal Myiasis and the common House Fly. (*Jl. Eco. Ent.*, XVIII, 334-36, April 1925.)

Frost, S. W.—The Leaf mining habit in the Coleoptera, Part I. (*Ann. Ent. Soc. Amer.*, XVII, 457-67, t. 1, Dec. 1924.)

Fryer, J. C. F.—A Discussion on the General Principles that should underlie Government Action respecting Fungicides and Insecticides. (*Ann. Appl. Biol.*, XII, 287-301, May 1925.)

Fuller, C.—

The Thorax and Abdomen winged Termites. (*Ent. Memoirs, No. 2, Dept. Agric. Union of South Africa*, 49-78, 1924.) [Ext. Anatomy and muscles of thorax.]

White Ant Experiments. Tests of the Resistency of Timbers. (*Ent. Memoirs, No. 2, Dept. Agric. Union of South Africa*, 81-101, 1924.)

The Egg-laying of a Grain Weevil. (*S. Afr. Journ. Nat. Hist.* IV 365-366; Sept. 1921.) [*Calandra oryzae*.]

F. T.—(T. F.)—Cultivation of Lac in the Khasi-hills, Assam. (*The Indian Forester*, LI, 614-615, pl. Dec. 1925.)

Fuschini, C.—Sono possibili interventi efficaci contro la "Flaccidezza." (*Boll. Staz. Speri. Gelsi. Bachi Ascoli Piceno*, IV, 234-238, Dec. 1925.)

G

Gadeau de Kerville, H.—Expériences sur la régénération homomorphe d'antennes de *Tenebrio molitor* L. (Col.) et la régénération homomorphe et heteromorphe d'antennes de *Carausius morosus*, Br. (Orth.) (*Bull. Soc. Ent. France*, 75-79, figs. 1-3, 1925.)

Gardner, J. C. M.—

Identification of Immature stages of Indian Cerambycidae, 1. Cerambycini. (*Ind. Forest Records, Ent. Series*, XII, 89-105, t. 3, 1925.)

On some Indian Brenthidæ (Coleoptera). Part III. Description of (a) the larva of *Cerobates tristriatus*, Lund (b) The larva of *Cerobates sexsulcatus*, Motsch (c) The Pupa of *Cyphagogus corporali*, Kleine. (*Indian Forest Records*, XI, 1-6, t. 1, 1925.)

Garretsen, A. J.—Enkele aan teekeningen over Helopeltis. (*De Thee*, IV, 125-128, Dec. 1925.)

Gantier, Cl. et Riel, Ph.—Nouvelles recherches sur *Apanteles gubriclis*, Gaut. et Riel (Hym. Braconidæ). (*Bull. Soc. Ent. France*, 167-170, Mai 1925.)

Gebien, H.—Die Tenebrioniden (Coleoptera) des indo-malayischen Gebietes, unter Berücksichtigung der benachbarten Faunen. (*Phil. Jr. Sc.*, XXVI-XXVIII, 1925.)

- I. Einleitung sowie die Gattung *Byrsax* Pascœ. (XXVI, 67-97, t. 1, Jan.) [Lit. 69-75. Bolitophaginae: Key to genera, 78-79; *Byrsax* Pascœ, 79-80, key to spp. 81-82, *B. tuberculatus*, Gravely, 82, t. 1. f. 7; *B. contemptus* Geb. in litt. Ceylon, Himalaya, Borneo, Java, 82-84; *B. cornutus* Fab., Coromandel, Ceylon, 84-85; *B. ovipennis*, n. sp., Ceylon, 87-88; *B. singhalus*, n. sp., Ceylon, 88-90-t. 1, fig. 6; *B. confrater*, n. sp., Ceylon, 93-94.]
- II. Die Gattungen *Atasthalus*, *Bolitoxenus*, *Bolitonauus*, und *Sumbawia*. (XXVI, 423-444, tt. 1-2, Mar. 1925.) [Genus *Atasthalus* Pascœ, Key spp. 423-424. Gen. *Bolitoxenus* Motschulsky, desc. 427-428, key spp. 428-429. Gen. *Bolitonauus* Lewis, 437, key spp. 438. *B. 4-dentatus* (Candeze), Ceylon, desc. 440. Gen. *Sumbawia*, n. g. 441-442, *S. tetrops*, n. sp., Sumbawa, 442-444, t. 1, fig. 7; t. 2, fig. 7.]
- III. Die Gattungen *Bradymerus*, *Chaetopsia*, *Danodema*, und *Dicraeosia*. (XXVI, 535-576, t. 1, April 1925.) [Genus *Bradymerus* Perroud, desc. 536, Key to Indian Spp. 537-541. *B. aratus*, n. sp., Ceylon, 543-545. *B. sericollis* (Walker) desc. 548-549, Ceylon, Weligama, Negombo. *B. acutangulus*, n. sp., Java; West Java; Kina Ondera, Malabar-Gebirge, 558-559, t. 1, fig. 2. *B. clathratus* Schaufuss, Ober-Assam, Andamanen, Sumatra, Java, Borneo, Formosa, Philippinen, Süd Celebes, 563. Catalogue of spp. 566-567. Genus *Chaetopsia*, n. 567, *C. angusticollis*, n. sp., Sumatra, Java, 568-569. *Danodema*, n. g. 570. *D. sulcatum*, n. sp., t. 1, fig. 5. Süd-Indien, Trichinopoly, 571. *Dicraeosia* Gebien, desc. 573-574.]
- IV. Die Gattungen *Phlaeopsidius*, *Dysantes*, *Basanus*, und *Diaperis*. (XXVII, 131-156, t. 1, May, 1925.) [Dysantinae, subfam. new: *Phlaeopsidius*, n. g. type *Endophleus flexuosus* Solander, 131-132. Diaperinae: general; key to genera. 142-143. *Basanus* Lacordaire, key spp. 144-145. *Diaperis* Linn. key to spp. 155.]

Gebien, H.—*contd.*

- V. Die Gattung *Ceropria*. (XXVII, 257-268, t. 1, June, 1925.) [Key to spp. 259-261. *C. decolorata*, n. sp., 265-266. *C. induta* var. *purpurina*, n. var., Sudindien, Himalaya, Assam etc., 277. *C. serripes*, n. sp., Tenasserim, 284-286.]
- VI. Die Gattungen *Ischnodactylus*, *Hoplocephala*, und *Mantianus*. (XXVII, 423-452, t. 1, July, 1925.) [*Ischnodactylus*, key to spp. 424-426, *I. unifasciatus*, n. sp., Ober-Assam, 444-445, t. 2, fig. 6.]
- VII. Die Gattung *Platytema* Castelnau und Brulle. (XXVII, 539-593, t. 1, Aug. 1925.) [Key to groups, 540. Key to Asiatic spp. 540-545, and 545-547. *P. ferrugineum* (Motschulsky) desc., Burma, 547-549. *P. pallidicelle* Lewis. Bengalen; Hinterindien; Cochins China, Formosa, Japan, Java, Philippinen, Insel Dammer, Surigao, Luzon, 551-555, t. 1, fig. 1. *P. subfascia* (Walker) desc., India, Japan, China, Sumatra, Java, Borneo, etc., 563-565. *P. pictipennis*, n. sp., S. Indien, 567-569, t. 1, fig. 12. *P. chalcum*, n. sp., Malabar Gebirge, Java, 572-573. *P. tricusps* Motschulsky, Indien, Burma, Sumatra, Java, Borneo, New-Guinea, Australien etc., 578-580. *P. deterum* (Walker) desc., Ceylon, Burma, Annam, Formosa, Sumatra, Siboga, Java, Borneo, Philippinen, Neu-Guinea, Neu-Süd Wales, Queensland, etc., etc. 583-585. *P. velutinum* Walker, Ceylon, Negombo, Puttalam, Nalanda, Anardadhapura, 586-588.]
- VIII. Die Gattungen *Anisocara*, *Spiloscapa*, *Menimus*, *Labidocera* und *Pentaphyllus*. (XXVIII, 101-128, t. 1, Sep. 1925.) [*Anisocara*, n. g., 101-102, *A. gynandromorpha*, n. sp., Java, 102-103, t. 1, fig. 1. *Menimus* Sharp, new desc. 106-107. Key to Asiatic spp., 108-109; *M. rugicollis*, n. sp., Ceylon, 113-114, t. 1, fig. 2. *M. ovalis* Allard, desc., Trichinopoly, Madura, Shembagnur, Khasias, 114-116, t. 1, fig. 3. *M. indicus*, n. sp., Madras, 116-117. *Labidocera*, n. g., 117-119. *L. abnormis*, n. sp., Mentawai, Java, 119-120, t. 1, fig. 4. *Pentaphyllus* Latreille, Key to spp. 121, *P. basalis*, n. sp., Ceylon, 121-122. *P. bifasciatus*, n. sp., Neu-Guinea, 123. *P. mentawicus* n. sp., Mentawai, 124-125. Many new spp. from other regions, and old spp. redescribed.]

Genieys, P.—*Habrobracon brevicornis*, Wesm. (*Annals Ent. Soc. America*, XVIII, 143-202, figs., June 1925.) [Effects of environments, biology and morphology.]

- George, C. J.**—Root-sucking Aphids of Coimbatore. (*Journ. and Proc. Asiatic Soc. Bengal*, N. S. XX, 307-310, pl. 13, 1924 (1925.) [*Tetraneura ulmi* De Geer; *Tetraneura* sp.; *Geocis* sp.; *Forda* sp.; *Rhopalosiphum avenae*, Fab.]
- Gestro, R.**—Materiali per lo Studio delle Hispidæ. LIV. Contributi alla sistematica della tribue descrizione di specie nuove (*Annali Museo Civico Storia Naturale*, LJ, 5-22, 1923-1925.) [*Dactylispa agilis*, n. sp., N. Bengal, Kurseong, p. 11-12.]
- Gill, C. A.**—The Role of *A. rossii* as a Carrier of Malaria. "The 1088i Problem." (*Indian Journ. Med. Res.*, XII, 773-781, April 1925.)
- Gilmer, Paul M.**—A Comparative Study of the Poison Apparatus of certain Lepidopterous Larvæ. (*Ann. Ent. Soc. America*, XLIII, 203-240, June 1925.)
- Glaser, R. W.**—Hydrogen Ion Concentration in the Blood of Insects. (*Journ. Gen. Phys.*, VII, 599-602.)
- Glasgow, R. D.**—A specimen of *Melanophus differentialis*, Thomas with four ocelli. (*Psyche*, XXXII, 285-290, 1 fig., Dec. 1925.)
- Godwin, E. St., G. S.**—The Cockroach. (*Journ. R. N. M. S.*, XI, 23-30, Jan. 1925.)
- Goetghebuer, M.**—
Catalogue raisonné des Culicides de Belgique. (*Bull. Ann. Soc. Ent. Belgique*, LXV, 209-219, July 1925.) [Keys.]
Contribution a l'etude des "Premandibules" chez les larves des Dipteres nemoceres. (*Encyc. Ent. Ser. B II*, Dipt. I, pts. 3 and 4, 143-157, 11 figs. 1925.)
- Goodacre, W. A.**—How Queen Bees Travel. (*Agric. Gaz. N. S. W.*, XXXVI, 632, Sept. 1925.) [Description and fig. travelling cage.]
- Gore, S. N.**—Calcium Cyanide fumigation. (*Ind. Journ. Med. Res.*, XIII, 287-299, Oct. 1925.)
- Graf, J. E.**—Sweet Potato Weevil Eradication. (*Journ. Wash. Acad. Sci.*, XV, 79, Feb. 1925.)

Graham Smith, H.—Nomenclature of Queen Bees. (*Agric. Gaz. N. S. W.*, XXXVI, 784, Nov. 1925.)

Grandi, G.—

Agonini e Sycophagini olartici e indo-malesi. 17° Contributo alla conoscenza degli Insetti dei Fichi. (Holarctic and Indo-Malayan Agoninae and Sycophaginae. Seventeenth Contribution to the Knowledge of Fig. Insects). (*Boll. Lab. Zool. Gen. and Agrar. R. Scuola sup. Agric.*, XVIII, 3-31, 11 figs. 1924.)

Biologia, morfologia e adattamento negli insetti dei fichi. (20. contributo alla loro conoscenza). (*Atti Soc. Ital. Sci. Nat.* LXIII, 288-311, 1925.)

Greene, Charles, T.—

A Tentative Arrangement of the Muscoid flies based on the Puparia. (*Proc. Ent. Soc. Wash.*, XXVII, 157-162, pl. X, Nov. 1925.)

The Puparia and Larvæ of Sarcophagid flies. (*Proc. U. S. Natl. Mus.*, LXVI, art. 29, 1-26, 9 pls. 1925.)

Green, E. E.—Some Episodes and Aspects of Insect Life in Ceylon. Presidents address. (*Trans. Ent. Soc. London*, 1924, Part V, May 1925.)

Gurney, W. B.—

For Control of slaters. (*Agric. Gaz. N. S. W.*, XXXVI, 624, Sep. 1925.) [Sodium flouride dusted lightly on ground diluted with some inert matter.]

Grasshopper swarms and their control. (*Agric. Gaz. N. S. W.*, XXXVI, 635-640, 6 figs. Sept. 1925.)

The Control of Fruit Fly. (*Agric. Gaz. N. S. W.*, XXXVI, 879-887, figs. Dec. 1925.)

H

Haines, G. C.—The Cotton Insect Situation. (*Jl. Dept. Agric. Union S. Africa*, XI, 361-365, Oct. 1925.)

Hall, W. J.—Notes on Egyptian Coccidæ with Descriptions of New species. (*Tech. Sci. Bull. No. 64, Min. Agric. Egypt.* 31, t. 6, 1925.) [n. spp.; list of host plants.]

- Hamilton, C. C., and Smith, C. M.**—A Colorimetric Method for showing the Distribution and Quantity of Lead Arsenate upon sprayed and Dusted surfaces. (*Jl. Eco. Ent.*, XVIII, 502-509, June 1925.)
- Hampson, G.**—Two new Genera and a new species of Oriental Hypeninae (Noctuidæ). (*Ann. Mag. Nat. Hist.* (9) XV, 408-409; March 1925.) [*Bleptinodes*, n. g., pp. 409-410, type *perumbrosa*, Hamp. 1898, Assam, Khasis, redescri.]
- Handlirsch, A.**—In Schroder's, Handbuch der Entomologie, Bd. III, 1201, 1040 t. figs. Jena, 1925.
- Hansford, C. G.**—Mosaic Disease of Sugar-cane. (*Proc. 9th W. Indian Agric. Conf. Kingston, Jamaica*, 1924, 76-82, 1925.)
- Harned, R. W., and Allen, H. W.**—Controlling Bed Bugs in steam heated rooms. (*Jl. Eco. Ent.*, XVIII 320-331, April 1925.)
- Hase, A.**—
 Weitere Versuche zur Frage der biologischen Bekämpfung von Mehlmotten mit Hilfe von Schlupfwespen. (*Arb. Biol. Reichsanst. Land Forstw.*, XIV, 163-169, Aug. 1925.)
 Beiträge zur Lebensgeschichte der Schlupfwespe *Trichogramma evanescens*, Westw. (*Arab. Biol. Reichsanst. Land Forstw.*, XIV, 171-224 9 figs., Aug. 1925.)
- Hautefeuille, L.**—Travaux anglo-indiens sur la Gomme-laque (*Rev. bot. app. agric. colon.*, V, 509-514, July 1925.)
- Hayden, Margaret A.**—Karyosphere formation and synopsis in the beetle, *Phanaeus*. (*Journ. Morph. and Physiol.*, LX, 261-287, 5 pls. 55 figs., June 1925.)
- Hayward, J. Kenneth.**—Migration of Butterflies. (*Entomologist* LVIII, pp. 169-170, July 1925.)
- Headlee, T. J., and Rudolfs, W.**—Some further Facts relative to the Principles underlying the Making and Use of Nicotine Dust. (*New Jersey Agric. Expt. Sta. Bull.* 400, 44 pp. 20 figs. Aug. 1925.)

- Heller, K. M.**—Studien zur Systematik der altweltlichen Balaunini (Coleoptera: Curculionidae). (*Stutt. Ent. Zeit.*, LXXXVI, 86-134, 1925.)
- Hermes, W. B.**—A case of Human Myiassiss caused by the Ox-warble *Hypoderma bovis*, DeG. (*Journ. Parasit.*, XI, 149-150, March 1925.)
- Hetschko, A., and Wasmann, E.**—Übersicht der Thorictidae mit Angabe der Wirte. (*Wien. Ent. Zeitung*, XLII, 183-189, Nov. 1925.) (*Thorictus fecae*, Grouv., Burma; *Thorictodes erraticus*, Champ., India.)
- Hilson, G. R.**—The Improvement of the Cotton Crop. (*Empire Cotton Growing Rev.* II, 201-208, July 1925.) [Insect Pests p. 206.]
- Hilton, W. A.**—Some Remarks on the Peripheral Nervous System of Insects. (*Ann. Ent. Soc. America*, XVIII, 537-542, t. I, 10, Dec. 1925.)
- Hingston, R. W. G.**—An oriental hunting wasp *Sphex lobatus*. (*Jl. Bom. Nat. Hist. Soc.*, XXX, 735-743 (Cont.) Dec. 1925.)
- Hoare, A. H.**—A Grower's Power Spraying outfit. (*Journ. Minist. Agric. London*, XXXII, 730-731, 1 fig. Nov. 1925.)
- Hoke, Gladys.**—A Diaspine with legs (Homoptera: Coccidae). (*Proc. Ent. Soc. Wash.*, XXVII, 36-39, t. 1, Feb. 1925.) [*Leucaspis-lucmion*, n. sp. on *Pinus pinea*, from Beirut, Syria.]
- Holmes, F. O.**—The Relation of *Herpetomonas elmassiani* Migone. to its Plant and Insect hosts. (*Biol. Bull.*, XLIX, 323-337, Nov. 1925.)
- Horn, W.**—Two new Cicindelinae from Ceylon. (*Ent. Rec. Jour. Variation*, XXXVII No. 5, 165-166, Dec. 1925) [*Collyris plantifrontoides*, n. sp., Anuradhapura, Wellawaya; *Cicindela henryi*, n. sp., Horawupotana].
- Horton, F. F.**—Paralysis of the Oesophagus in the Horse due to *Gastrophilus equi*.—(*Vet. Journ.*, LXXXI, 233-235, 1925.)

- Horvath, G.**—Description of a new Bat-Bug from India. (*Rec. Ind. Mus.*, XXVII, 191-192, fig. May 1925). [*Macroranella pattoni*, n. sp.].
- Hough, W. S.**—The Internal anatomy of the Clover Root Mealy-bug *Trionymus trifolii*, Forbes (Homoptera, Coccidae). (*Bull. Ent. Res.*, XVI, 25-29, figs, July 1925).
- Howard, C. W. and Buswell, K. P.**—A Survey of the Silk-industry of South China. (*Agric. Bull. No. 12*, 205 pp. Ling Nau Agric. Coll. Jan. 1925.)
- Howard, L. O.**—
The Needs of the World as to Entomology. (*Ann. Ent. Soc. America*, XVIII, 1-21, March 1925).
Parasitic Hymenoptera Feeding by Indirect suction. (*Ent. News*, XXXVI, 129-133, May 1925).
- Huber, L. L.**—Some Spray Tests with Oil Emulsions. (*Jl. Econ. Ent.*, XVIII, 547-548, June 1925.)
- Husain, M. A.**—
The Mango-hopper and how to control it. (*Punj. Agric. Dept. Seasonal Notes*, II, 5-6, Mar. 1925.)
Report on the operation of Dept. Agric. Punjab 1923-24, (1925.)
[Entomology and Sericulture Appendix IV, XXVI-XXXIV.]
Report of the Imperial Entomologist 1924-25. (*Scientific Reports of the Agricultural Research Institute, Pusa*, pp. 58-64, 1925.)
- Hustache, A.**—
Curculionid Nouveaux des Philippines et L'Orient (*Phil. Journ. Sci.* XXVII, 371-396, July 1925) [Many new species following Indian spp., *Lobotrachelus luteofasciatus*, n. sp. 381; *L. himalayanus*, Hust. 382; *L. bertrandi*, Hust. 382; *L. pusillus*, Hust. 383.]
- Hutchinson, C. M.**—Micro-anatomy of *Cimex*, with special reference to the technique of Insect Histology. (*Ind. Journ. Med. Res.*, XII, 487-498, tt. 37-39; Jany. 1925.)
- Hutson, J. C.**—
Further Notes on some of the Caterpillars attacking Coconut leaves. (*Year Book Dept. Agric. Ceylon*, 1925.)

Hutson, J. C.—*contd.*

The Paddy Swarming Caterpillar. (*Leaflet No. 32, Dept. Agric. Ceylon*, 1925.)

The Tea Tortrix. (*Leaflet No. 32 Dept. Agric. Ceylon*, 1925.)

I

Imms, A. D. —A General Text Book of Entomology (1925).

Inns, F. A.—The prodaceous habits of the larvæ of *Mucidus scatophagoides*. (*Ann. Trop. Med. and Parasit.*, XIX, 466, 1925.)

Isaac, P. V.—

Papers on Indian Tabanidæ, IV-VII. (*Mem. Dept. Agric. India, Ent. Ser.*, VIII, 93-109, 5 pls. 7 figs. April 1925.)

[The Head and Mouth Parts of the larva of *Tabanus rubidus*, Wied, 93-96. The mechanism of suction in the larva of *Tabanus tenens*, Wlk., 97-102. The male and female genitalia of *Tabanus tenens*, Wlk., 102-108. Notes on the Life history of *Tabanus striatus*, Fb., 108-109.]

Papers on Indian Tabanidæ, VIII. The Bionomics and Life-histories of some of the common Tabanidæ of Pusa. (*Mem. Dept. Agric. India, Ent. Series*, IX, 21-28; pl. V-X; June 1925.)

[*Tabanus macer*, Bigot. *T. rubidus*, Wied., *T. tenens*, Wlk. *T. virgo*, Wied.; *T. nemocallosus*, Ricardo, *Castrozides ater*, Saunders.]

Some observations on the Life-history and Habits of *Phycus brunneus*, Wied. (Fam. Therevidæ). (*Mem. Dept. Agric. India, Ent. Series*, IX, 29-30, pl. XI, June 1925.)

The South Andaman Coconut Slug-caterpillar (*Thosca unifascia* Wlk.) (*Agric. Journ. Ind.*, XX, 373-379, pl. XXVIII, Sept. 1925.)

J

Jacobson, W. C.—Bureau of Plant Quarantine and Pest Control. (*Mithly. Bull. Cal. Dept. Agric.* XIII (1924) 156-161, 1925.)

Jardine, N. K.—The Control of Tea Tortrix (*Year Book Dept. Agric. Ceylon*, pp. 4-6, 1925.)

Jarvis, Edmund.—Notes on Queensland Cane Insects and their Control. (*Bureau of Sugar Experiment Station. Division of Entomology Bulletin*, No. 18, 1925.)

- Jeffrey, E. C.—Polyploidy and origin of species (*Amer. Naturalist*, LIX, 209-217, May-June, 1925.)
- Jegen, G.—Die protozoäre Parasitenfauna der Stechfliege, *Stomoxys calcitrans*. (*Zool. Jahrb.*, XLVI, 389-472, 10, tabs., 1924) (Abstr. Rev. Appl. Ent. XIII B 31.)
- Jepson, F. P.—The Control of Shot-hole borer of Tea (*Xyleborus formicatus*). (*Year-Book Dept. Agric. Ceylon* 1925. pp. 6-10, 1925.)
- de Joannis, J.—Sur la synonymie de quelques espèces du genre *Psara* Snell. (Lep. Pyralidæ, Agrotinæ) (*Bull. Soc. Ent. France*, 286-290, Nov. 1925.)
- Jordan, Karl—
 New Siphonaptera. (*Nor. Zoo.*, XXXII, 96-112 figs. April 1925). [*Ctenocephalus felis orientis*, n. sub sp. Type, Ceylon: Peradeniya, off *Loris gracilis*, evidently throughout Oriental Region except Australia, known from Ceylon, India, Malay, Sumatra, Philippines, Rook I., and Admiralty Is. p. 99; *Parodontis subjugis*, n. sp., Malay Peninsula: Mbu Gombak, Selangor, on *Hystrix longicaudata*, p. 103; *Ceratophyllus melius* n. sp., probably Asiatic, p. 107; *C. phillipsi*, n. sp., Ceylon, St. George, Matugama, p. 107.]
 Siphonaptera collected by Rear Admiral H. Lynes in Darfur in 1920 to 1922. (*Nor. Zoo.*, XXXII, 113, 1925.)
 Five New Indian Anthribidæ. (*Nor. Zoo.*, XXXII, 239-241; 1925) [*Litocerus phelus*, n. sp., Assam: Naga hills, 5,000 ft., p. 239; *Tropideres rigens*, n. sp., Assam: Naga hills, 5,000 ft., p. 239; *Cedus valens*, n. sp., Assam: Jiri Forests, Cachar, pp. 239-240; *Zygantodes triangularis*, n. sp., N. W. India: Dehra Dun, (ex *Pinus longifolia*) p. 240; *Xylinaules bersoni*, n. sp., Madras: Nedungayam, Nilambur, (ex *Pterocarpus marsupium*) pp. 240-241.]
 Anthribidæ from the Eastern Hemisphere. (*Nor. Zoo.*, XXXII, 242-257, 1925). [*Rhaphitropis indicus*, n. sp., N. W. India, Kulu, p. 248; *R. cor*, n. sp., S. India: Nilgiri Hills, p. 249; *R. stevensi*, n. sp., Nepal-Sikkim frontier: Gopaldhara, 3,440 ft. and 4,920 ft., p. 250; *R. tamilis*, n. sp., Ceylon: Kandy, p. 250; *Atinellia*, n. g., p. 252, *A. senex*, n. sp., Ceylon: Kandy, p. 252; *Uncifer diffinis*, n. sp., Ceylon: Kandy, p. 253-4.]
 On *Delias belladonna* and allied species (Lep. Rhop.) (*Nor. Zoo.*, XXXII, 277-287, Dec. 1925.) [Revision, distribution p. 278;

Jordan, Karl—*contd.*

Key to species pp. 278-279; *D. belladonna lugens*, n. sub sp., Assam: Khasia Hills, Naga Hills, N. W. Burma; S. Chin Hills; p. 286. *D. belladonna hedybia*, n. sub-sp., Tennasserim: Shan States, p. 286).

Two new Indian Anthribidæ, received from the Forest Research Institute and College at Dehra Dun. (*Nov. Zoo.*, XXXII, 290-291, Dec. 1925). [*Acorymus aspersus*, n. sp., Assam: Haflong, Cachar; *A. silvanus*, n. sp., Assam: Haflong, Cachar].

K

Kahan Singh.—A further Note on Surra Transmission Experiments with Ticks. (*Dept. Agric. Punjab, Vet. Bull.* 16, 1925.)

Kamesan, S.—Summary of results of Laboratory Experiments with different Wood Preserving Antiseptics. (*Forest Bull.* No. 64, 1-28, several graphs, 1925).

Karawaiew, W.—

Ponerinen (Fam. Formicidæ) aus dem Indo-Australischen Gebiet (*Konowia*, IV, 69-81; 115-131; March, July 1925).

[*Centromyrmex* fæ. Em., Ceylon: Kandy p. 81; *Erponera* (Subgen. *Brachyponera* Em. *luteipes*, Mayr., Peradeniya, Ceylon. pp. 124-125; *Ectatomma* (Subgen. *Stictocnema*, Mayr.) *coalis*, Rog. redesc. Java, p. 75; *Pachycondyla* (Subgen. *Ectomyrmex*, Mayr.) *astuta* Sm. redesc. Buitenzorg, pp. 120-1; *Pseudocnema amblyops*, Em Buitenzorg, pp. 127-128].

Karny, H. H.—

Einiges über die Gryllacrisarten des Typus IV. (*Zeit. Wiss. Zool.* CXXXV, pp. 35-54, fig. 9, June 1925).

Cricket-locusts (Gryllacridæ), chiefly from the Philippine Island. (*Phil. Jl. Sc.* XVIII, 131-171, tt. 1-10, Sep. 1925.)

On some Tropical Thysanoptera. (*Bull. Ent. Res.*, XVI, 125-142, figs. Oct. 1925.) [*Oedemothrips ceylonicus*, n. sp., 137-139 Ceylon: Peradeniya].

Malaysian Gryllacridæ. (*Journ. Fed. Malay-States, Museums*, XIII, 1-67, tt. 2, Dec. 1925.) [Many new spp.; some already described Indian spp.]

- Keler, S.**—Ein Versuch der Anwendung mathematisch statistischer Methoden auf die entomologische Systematik mit Beschreibung einer neuen Borkenkaferart 1 ps. feiferi n. sp. und Bemerkungen über 1 ps. erosus Woll. (Polskie Pismo ent., IV, Pt. 3, 149-196, 4 pls. 2 figs., numerous tables, 1925.)
- Kennady, Clarence H.**—The Distribution of certain Insects of Reversed Behavior. (*Bio. Bull.*, XLVIII, 390-401, June 1925.)
- Kérandel, J.**—Riziculture et distribution géographique du paludisme en Indo-Chine. Insectes prédateurs de larves de moustiques. (*Bull. Soc. Path. Exotique.*, XVIII, 815-21, Dec. 1925.)
- Kieffer, J. J.**—Ein neuer, von Prof. Dr. Friedrichs gezüchteter Embiidenparasit. (Bethyloid, Hym.). (*Ent. Mitteilungen*, XIV, 236-237, July 1925.) [*Mystracnensis embiidarum*, n. sp., parasitic on *Oligotoma greeniana*, End., Ceylon, Colombo.]
- King, H. H., and Johnston, H. B.**—A simple form of distributor for insecticide dusts. (*Bull. Ent. Res.*, XVI, 175-176, fig. Oct. 1925.)
- Kirkpatrick, T. W.**—
 A Preliminary Note on the Determination of Egyptian Mosquitos, with Description of three Species new to Science. (*Bull. Soc. R. ent. d'Egypte*, (1924) 362-391, 15 figs., 1925.)
 Notes on the Fungus *Rhizopus nigricans*, Ehr., in Relation to Insect Pests of the Cotton Plant in Egypt. (*Ministry of Agric., Egypt., Technical and Scientific Service, Bull.* No. 54, 1925.)
- Kleine, R.**—
 Drei neue Lycidengenera des orientalischen Gebietes. (*Stettiner Ent. Zeit.*, LXXXV, pp. 133-136, 1925.) [*Prometanaxus* n. g., *P. ochraceus*, n. sp., Ceylon, Dikoya; *Parataphes*, n. g., *P. doherthyi*, n. sp., Burmah: Ruby Mines, Indian-Travancore Tea Co Permaad; *Dilophotellus*, n. g., *D. tricostratus*, n. sp., W. Sarawak; *D. legitimus*, n. sp., W. Sarawak.]
 Dritter Beitrag zur Kenntnis der Lycidæ: Die Neue Gattung *Leptotrichalus*. (*Phil. Jl. Sc.*, XXVIII, 295-311, tt. 1-6, Oct. 1925.) [N. gen., many n. spp., from Philippines etc.]
 On some Indian Brentithidæ (Coleoptera). Part I. Neue Brentithiden aus Britisch Indien und den anliegenden Gebieten. (*Indian*

Kleine, R.—contd.

Forest Records, Ent. Series, XI, 124-170 (1-48), tt. 2, 1925.) [Calodromini: *Cyphagogus concavus*, n. sp., Penang, p. 2; *C. confertulus*, n. sp., Burma, Assam, p. 3; *C. confidens*, n. sp., Siam, p. 4; *C. fragosus*, n. sp., Assam, Garo hills, p. 4; *Allaometrus deformis*, n. sp. Assam, p. 5; *Opisthenoxys fanulus*, n. sp., Pashok, 2,000 ft., Darjeeling, p. 6; *Parusambius*, n. g., p. 7; *P. fraudulentus*, n. sp., Assam, 3,500-3,900 ft., Garo hills, p. 7; Stereodermini: *Cerobates collectivus*, n. sp., Burma, p. 8; *C. concisus*, n. sp., Ceylon, p. 8; Trachelizini: *Trachelizus dividuus*, n. sp., Darjeeling, Gopaldhara, 4,720-6,200 ft., p. 9; *Anocamaru catenata*, n. sp., Penang, p. 10; *Metatrachelizus congruens*, n. sp., Assam, p. 10; *Hemisambius*, n. g., p. 10; *H. contemptus*, n. sp., Laos, p. 11; *Hypomiolisma conjugalis*, n. sp., Andaman Is., p. 12; *H. cruda*, n. sp., Assam, p. 13; *H. conjuncta*, n. sp., Tenasserim, p. 14; *H. colorata*, n. sp., Ceylon, p. 14; *Araiorrhinus conquisitus*, n. sp., Perak, p. 16; *A. beesoni*, n. sp., Burma, p. 16; *Tulotus maculipennis*, Senna., Burma, Assam, East India, p. 17; *Microtrachelizus beneficus*, n. sp., Assam, p. 17; *M. apertus*, n. sp., Borneo, Assam, p. 18; Amorphocephalin: *Paussobrenthus conterminus*, n. sp., Cambodia, p. 19; *P. concitatus*, n. sp., Andaman Is., p. 20; *Leptamorphocephalus cuneatus*, n. sp., Assam, p. 20; *L. cupidus*, n. sp., India, p. 21; *Amorphocephalus delicatus*, n. sp., Karachi, p. 22; Arrhenodini: *Perorychodes*, n. g., p. 23; *P. arrowi*, n. sp., (genus type), Allahabad, p. 24; *Hemiorychodes dissonus*, n. sp., Perak, p. 24; *H. curvus*, n. sp., Manipur, Burma, p. 25; *H. contextus*, n. sp., Cambodia, p. 26; *H. continens*, n. sp., Penang, p. 27; *Pseudorychodes damnosus*, n. sp., Perak, p. 27; *Suborychodes delectabilis*, n. sp., Assam, p. 28; *Parorychodes cereus*, n. sp., Assam, Nambor Res., Sibsagar, pp. 29-30; *Calorychodes*, n. g., p. 30; *C. decens*, n. sp., Burma, p. 31; Belophagini: *Euphengus distributus*, n. sp., Perak, p. 32; *E. delibetatus*, n. sp., Bombay: Kanara, p. 32; *Heteroblysmia cara*, n. sp., Penang, p. 33; *Teraticorhynchus*, n. g., (type) *T. defectus*, n. sp., Tenasserim, pp. 33-35; *Pseudobelopherus deductus*, n. sp., Perak, p. 35; *Ectocenus contractus*, n. sp., Cambodia, p. 36; *Anepsiotus bellus*, n. sp., B. India, Katgal, p. 37; *A. commendabilis*, n. sp., S. India, Travancore, p. 37; Ithystenini: *Plesiochocylides*, n. g. (type) *Pl. conditus*, n. sp., India, Sylhet, pp. 38-39; *Diurus compendarius*, n. sp., India, p. 40; Pseudocoecephalini: *Metatrachelus*, n. g. (type) *M. comparativus*, n. sp., Penang, pp. 40-41. Key to sub-fam. p. 43, Key to genera: 43-48.]

Kleine, R.—*contd.*

Die Gattung *Macrolysus*, C. O. Wtrh. (*Deutsch. Ent. Zeitschr.*, 325-331, Nov. 1925.) [Key to spp. 326; *M. coccineus*, C. O. Waterh., Allahabad, Darjeeling Upper Burma, Tonkin, 326-7; Catalogue, 331.]

Kleine, R., Spaeth, Fr., and Mosey, J.—Wissenschaftliche Ergebnisse der Bearbeitung der Coleopteren—Sammlungen von Franklin Muller. (*Ent. Mitteilungen*, XIV, 52-57, Jan., 1925.) [Melolonthiden. *Autoserica franklin-mülleri*, n. sp. (Moser) India: Coimbatore, pp. 56-57.]

Kligler, I. J. and Theodor, O.—Effect of Salt Concentration and Reaction on the development of *Anopheles* larvae. (*Bull. Ent. Res.*, XVI, 45-49, July 1925.)

Knight, H. H.—On the nature of the colour patterns in Heteroptera with data on the effect produced by temperature and humidity. (*Ann. Ent. Soc. America*, XVII, 258-274, September, 1924.)

Ko, R.—On the Colour-preference of Mosquitos. (*Journ. Formosan Med. Soc.* No. 244, 1925.)

Kopp, A.—La mosaïque de la canne à sucre. Son apparition aux Antilles françaises. Quelques faits nouveaux. (*Rev. Bot. App. and Agric. Colon.*, V, 411-417 and 519-526. June and July 1925. Extract as: Bull. Tech. No. 1 Station Agronomique de la Guadeloupe, 1925.)

Kunhi Kannan, K.—

A serious Pest of Cardamoms (*Planters' Chronicle*, XIX. No. 44, pp. 824-836, Dec. 1924—from *Journal Mysore Agric. Union*; also in *Mysore Agricultural Calendar*, 1925, 32-36).

The Coffee Borer. (*Mysore Agric. Dept. Calendar* 1925 pp. 5-8.) [*Exylotrechus quadripes*.]

Report of the Entomologist, (*Ann. Rept. Agric. Dept. Mysore*, pt. II, 10-12, 1925.)

The Lime Tree Borer (*Chelidonium cinetum*). (*Mysore Agric. Calendar* 1924; 16-18, 1 pl., 1 fig.)

The Coffee Borer. (*The Planters' Chronicle*, XX, 922-924, Dec. 1925.)

The Jola Ear-head Fly. (*Journ. Mysore Agric. and Exper. Union*, VII, p. 85, 1925.)

L

- Laidlaw, F. F.**—Description of a new Genus and two new species of Dragonflies (Odonata) belonging to the Family Gomphidae from Tropical Asia. (*Proc. Zool. Soc. London*, 439-444, 2 figs., July 1925) [Genus *Aerogomphus* nov.; *A. fraseri* n. sp., Sampaaji Ghat, Coorg; *A. mclayanus*, n. sp., Johore.]
- Lal, R. B., and Tiwari, C. D.**—A Note on the Disinfestation of Houses by Fumigation with Cresol. (*Ind. Med. Gaz.*, IX, 255-258, June 1925.)
- Lapie, G.**—Les chenilles venimeuses et les accidents qu'elles provoquent chez l'homme et chez les animaux domestiques. (*Vie agric. et rur.*, XXVII, 50-54, 7 fig., 1925.)
- Larson, A. O., and Fisher, C. K.**—Longevity and Fecundity of *Bruchus quadrimaculatus* Fab. as influenced by different Foods. (*Jl. Agric. Res.*, XXIX, 297-305, Sep. 1924.)
- Leach, B. R., and Johnson, J. P.**—Emulsion of Wormseed Oil and of Carbon Disulfide for destroying Larvæ of the Japanese Beetle in the Roots of Perennial Plants. (*U. S. Dept. Agric. Bull.* 1332, 17 pp., 2 figs., Washington, D. C., May 1925.)
- Lebailly, C.**—Les mouches ne jouent pas de rôle dans la dissémination de la fièvre aphteuse. (*C. R. hebdom. Acad. Sci.*, CLXXIX, 1225-27, 1924.)
- Lécaillon, A.**—Le Négril de la Luzerne (*Colaspidema atrum* Olivier) Etude monographique. (*Ann. Epiphyties*, XI, 235-300, tt. 1-2, July-Aug. 1925.)
- Leckie, V. C.**—Some notes on Surra in the Camel, its Treatment and Prevention. (*Vet. Jl.*, LXXXI, 281-292, 346-352, 398-404, 491-499, 546-553, 6 figs., June-November 1925.)
- Lees, A. H.**—Egg-killing Washes. (*Ann. Rept. Agric. ann. Horti. Res. Sta.*, 1924, 51-60, Bristol, 1925.)
- Lengerken, H. V.**—Zur Morphologie des Colcopterenabdomens. (*Zool. Anz.*, LXIII, 41-45, June 1925.)

Lieftinck, M. A.—Odonata Neerlandica, (Zygoptera). (*Tijd. Ent.*, XXVIII, 61-174, figs., 1925.) [Bibliography, 488 titles, pp. 71-93; Keys. Descriptions.]

Lindner, E.—Die Fliegen, der Palarktischen Region. 13, Tabanida, pp. 33-80, 1925.

Lineburg, B.—Communication by scent in the honey bee—a theory. (*Amer. Naturalist*, LVIII, 530-537, Nov.-Dec. 1924.)

Lloyd, R. B., Napier, L. E. and Smith, R. O. A.—The "Blood Meal" of *Phlebotomus argentipes* identified by Precipitin Antisera. (*Ind. J. Med. Res.*, XII, 811-816, 1 v., April 1925.)

Lucas, W. J.—Caudal Lamellæ of the Naiads of the British Zygopterid Dragonflies. (*Proc. S. London, Ent. an Nat. Hist. Soc.*, 1924-1925, pp. 1-7.)

M

Macfie, J. W. S.—A new blood-sucking midge from Singapore. (*Bull. Ent. Res.*, XV, 349-351, fig. 1, April 1925.) (*Hamophoructus*, g. n. *H. maculipennis*, n. sp., Malaya : Singapore.)

MacGregor, M. E.—Mosquitos under winter conditions. (*Evil. Ent. Res.*, XV, 357-2358, 1925.)

Mackie, F. P.—The Insect Menace. (*Ind. Med. Gaz.*, IX, 172-178, April 1925.)

Mackie, W. W.—Prevention of Insect attack on Stored Grain. (*California Agric. Expt. Sta. Circ.* 282, 1 fig., Feb. 1925.)

Mahdihassan, S.—Some Insects associated with Lac and a Symbolic representation of their Interrelationship. (*Journ. Ec. Ass. Maharajah's Coll. Vizianagram* II 64-88, 1925.)

Maidl, F.—Fauna Sumatrensis: (*Ento. Mitteilungen*, XIV, 376-550, 1925.) [Several Indian species are recorded from Sumatra; *Ammophila clavus*, Fb. = *atripes*. Sm.]

Malan and Malan.—Spermatogenesis of *Locustana pardalina* (Brown tree locust) (*Trans. R. Soc. South Africa*, XII, 1-22.)

Malloch, J. R.—

Exotic Muscaridae, XV. (*Ann. Mag. Nat. Hist.*, (9) XV, 131-142, figs., Jan. 1925) [*Musca* spp., 131-136, figs. 1-4.]

Some Indian species of the Dipterous Genus *Atherigona*, Rondani. (*Mem. Dept. Agric., Ent. Ser.*, 111-122, pt. 2, April 1925.) [*Atherigona atripalpis*, n. sp., Coimbatore, S. India; *A. dentifera*, n. sp., Pelaboean, Ratoe, Java; *A. oryzae*, n. sp., Coimbatore; *A. erichloae*, n. sp., Madras; *A. miliaceae*, n. sp., Pusa; *A. approximata*, n. sp., Pusa, Bihar. Key to the Indian species of *Atherigona* based mostly on males.]

Mally, C. W.—A Means of catching the Fruit nibbler-*Odontomyia sericea*, Gyll. (*Dept. of Agric. Union of South Africa*, Reprint No. 45, 7 pp., 3 figs., *Journ. Dept. Agric.*, Oct. 1924.) (Jarring the tree under which is spread a sheet of double width lessian coated with thin layer of tanglefoot.)

Manuel, H. L.—Use of Spreaders with Bordeaux Mixture. (*Agric. Gaz., N. S. W.*, 702, Oct. 1925.) [Casein at the rate of 1 oz. to 10 galls. of mixture, and resin fish oil soap—one pint to 25 galls. recommended, both supposed to be equally good.]

Marchal, P., et Vayssiére.—Étude sur la Désinfection, des produits végétaux et des denrées agricoles. (*Ann. Epiphyties*, XI, 121-183, 10 pl., May-June 1925.)

Marchoux, E.—Modes divers d'hibernation de l'*Asopheles maculipennis*. (*Bull. Soc. Path. Exot.*, XVIII, 405-407, May 1925.)

Marcovitch, S.—Non-Arsenicals for Chewing Insects. (*Jl. Econ. Ent.*, XVIII, 122-128, Feb. 1925.)

Marshall, G. A. K.—

New Curculionidæ attacking trees in India. (*Bull. Ent. Res.*, XV, 333-344, t. 16, April 1925.) [Sub-fam.—Otiorrhynchinae: *Corigetus instabilis*, sp. n., Bombay; Kanara, defoliating *Casuarina equisetifolia*; Sub-fam. Magdaleninae: *Megdalis himalayana*, sp. n., United Prov.: Dharmoli, Kumaon; Kanasser, 5,500 ft., Chakrata, bred from *Pinus logifolia*; Sub-fam. Cryptorhynchinae: *Camptorrhynchus mangifera*; sp. n., Bihar and Orissa: Hoina River, Singhbhum, bred from *Mangifera indica*; Sub-fam. Zygopinae: *Phylaitis pterospermi*, sp. n., United Provinces. Golaappar, Dehra Dun, bred from wood of *Pterocarpium*,

Marshall, G. A. K.—*contd.*

acerifolium; *P. scutellaris*, sp. n., United Provinces: Riverian Forest, Nagsidh, Dehra Dun, bred from *Eugenia jambolana*; Lachiwala Range, Dehra Dun, bred from *Acacia pennata*; Bombay: Nasik, bred from *Cassia auriculata*.]

New Curculionidæ attacking cultivated Plants (Col.) (*ibid.* XVI. 67-75, t. 1, July 1925.) [Sub-fam. Erirrhina: *Echinocnemus oryzae*, n. sp., Madras, Kaikalur, Krishna Dist. Samalkot, Thurumella, Guntur District, p. 73, t. fig. 2.]

Marshall, J. F.—Some Practical Notes on Mosquito Control. (*Hegling Mosquito Control*, Circ. 16, 4 pp., 6 figs., 1925.)

Martini, E.—Bei bionomischen und physiologischen Daten Temperaturangaben nicht vergessen. (*Zool. Anz.*, LIX, 170-172, April 1925.)

Mason, F. A.—The Khapra Beetle in British Maltings. (*Bull. Bur. Bio-Technol.*, II, No. 13, pp. 118-123, Dec. 1924.) (Abstr. Rev. Appl. Ent., XIII, A, 91.)

Maulik, S.—

Deuxième Note sur *Callispa latipennis* Pic. (*Entomologist*, LVIII, pp. 166-167, July 1925.)

Note on the Nomenclature of the Coleopterous Genera, *Chrysomela*, I, and *Melasoma*, Steph. (*Ann. Mag. Nat. Hist.*, XV, 95-96, Jan. 1925.)

McCarthy.—The Poisoning of Fruit Flies. (*Agric. Gaz. N. S. W.*, XXXI, 667-669, Sept. 1925) [Various formulae.]

Megaw, J. W. D.—The Transmission of Dengue Fever. (*Ind. Med. Gaz.*, LX, 377-378, 1925) [*Stegomyia* mosquito—*Aedes aegypti*—*Stegomyia fasciata* is able to convey dengue fever man to man.] Indian Tick-Typhus (*Ind. Med. Gaz.*, LX, No. 2, 58-61, 1925.)

de Meijere, J. C. H.—Die Larven der Agromyzinen. (*Tijd. Ent.*, XXVIII, 195-293, figs. 1925.)

Melander, A. L.—Miscellaneous Pests and their Control. (34th Ann., Rept. Washington, Agric. Expt. Sta. 1923-1924, Bull. 187, 46-52. Pullman, Wash., Dec. 1924.) [Soil fumigants: amount of volatile poisons required to saturate a given quantity of soil and rate of killing buried insects.]

Meleney, H. E.—Schistosomiasis et Kala-Azar en Chine. (*Bull. Soc. Path. Exot.*, XVIII, 364-368, May 1925.)

Menzel, R.—

Helopeltis en sluipwespen. (*De Thee*, IV, 118-119, Dec. 1923.)

Over een parasiet van *Helopeltis*. II. De in *Helopeltis* parasiterende sluipwesp. (*De Thee*, V, 24-29, 1 pl., March-June 1924.)

Mermithiden als Parasieten van *Helopeltis*. (*Mededeelingen Proefstation voor Thee*, XCIV, 3-9, figs. 1925.)

Nadere Beschrijving van den *Helopeltis* Parasiet, *Euphorus helopeltidis*, n. sp. (*De Thee*, VI, 1925.)

Euphorus helopeltidis Ferr., de in *Helopeltis*—Mikoengs parasiterende Sluipwesp (Braconidæ). (*De Thee*, VI, 1 t., 1925.)

Het optreden van *Euphorus helopeltidis*, in Deli als Parasiet van *Pachypeltis*. (*De Thee*, VI, 1925.)

Mercier, et Villeneuve.—Contribution à l'étude de l'anatomie de la tête des diptères cyclorhaphes, La ptilin et le Muscle ptilino pharyngien. (*Comptes Rendus, Acad. Sci., Paris*, CLXXXI, 882-4, 1925.)

Metcalf, C. L.—Warfare against the Insects. (*55th Annual Report, Ent. Soc. Ontario*, 1924, 30-46, 1925.) [Excellent summary of control measures.]

Meyer, N. F.—Zur Biologie und Morphologie von *Pimpla exanimator*, Fabr. (Hymenoptera, Ichneumonidæ). (*Zeit. angew. Ent.*, XI, 202-212, 12 figs., July 1925.)

Meyrick, E.—

(*Exotic Microlepidoptera*, Vol. III, pt. 5, pp. 129-160, Jan. 1925.)

[Glyptipeterygidæ: *Imma didicata*, n. sp., p. 133, Bombay;

Phalonidæ: *Phalonia thermoconis*, n. sp., p. 139, Kashmir;

Scinagar, 5,200 ft.; Kumaon, Muktesar, 7,000 ft.; Eucosmidæ:

Aeroclista paulina, n. sp., p. 140, Kumaon, Muktesar, 7,000 ft.;

Eucosma hypsidryas, n. sp., pp. 140-1, India: U. P. Deolan,

Chakrata Div., 9,000 ft. (bred from larvæ in buds of *Picea morinda*);

Eucosma phoenocrossa, n. sp., p. 141-2, South India, Travancore

(bred from *Careya arborea*); *Eucosma dryocarpa*, n. sp., p. 142,

India, U. P. Mussorie, 6,000 ft., Dehra Dun, (bred from *Quercus*

dilatata); *Argyroplœce niphodelta*, n. sp., pp. 143-144, Assam,

Shillong, 5,000 ft.; *Laspeyresia amphilecta*, n. sp., p. 145, Bihar

Meyrick, E.—*contd.*

Pusa; *Blastobasis ochromorpha*, n. sp., 145. India : U. P., Dehra Dun (bred from seeds of *Shorea robusta*): *Xyloryctidæ*: *Acolanthes ampelurga*, n. sp., p. 146, Kumaon. Muktesar, 7,000 ft.; *Ptochoryctis involata*, n. sp., p. 152, Bomlay. Karwar.] Wegener's Hypothesis and the Distribution of Micro-lepidoptera. (*Nature*, CXV, 834-835, May 1925.)

Michael, D. F.—Note on the incidence of Kala-azar on the Pusa Estate. (*Ind. Journ. Med. Res.*, XIII, 131-139, 1925.)

Miége, E.—Action du Paradichlorobenzène sur les parasites et sur la faculté germinative des grains de céréales. (*C. R. Acad. Agriv. France*, XI, 683-686, 1925.)

Mills, P. S.—Interesting effect of an insect bite. (*Ind. Med. Gaz.*, LV, 473, Oct. 1925.)

Missiroli, A.—A tubuli del Malpighi nell' *Araphiles claviger* il erante. (*Ann. d. Igien.*, XXXV, 113-122, 1 chart, 2 figs. 1925.)

Mjöberg, Eric.—The Mystery of the so-called "Triolite larvæ" or "Perty's larvæ" definitely solved. (*Psych.*, XXXII, 117-118, 2 pls., June 1925.)

Morgan, E.—Maggots as an indirect cause of Joint-ill in calves. (*Vet. Journ.*, LXXXI, 243-247, 1925.)

Morrison, H.—Classification of Scale Insects of the sub-family Ortheziinæ. (*Jl. Agric. Res.*, Washington, XXX, 97-160, 42 ff., Jan. 1925.) [Keys, descriptions.]

Morshead, R. Y. A.—Extraordinary display of 'Leucodice soracte' of the genus "Aporia." (*Jl. Bom. Nat. Hist. Soc.*, XXX, 923 t., Dec. 1925.)

Morstatt, H.—

Bibliographie der Pflanzenschutzliteratur, 1924. Berlin, 1925.
Preliminary check list of "common names" used in applied Entomology. (*Supplementa Entomologica*, 1-16, August 1924.)

Mortensen, Th.—Some observation on protective Mimicry. (*Trebua*, VI, 207-211, Feb. 1925.)

Muesebeck, C. F. W.—A Revision of the Parasitic Wasps of the Genus *Microbracon* occurring in America, North of Mexico. (*Proc. U. S. Natl. Mus.*, LXVII, art. 8, 85 pp., 2 pls. Washington, 1925.) (Abstract *R. A. E. A.*, XIII, 411, August 1925.)

Mukherji, D., and Ribeiro, S.—On a collection of ants (Formicidae) from the Andaman Islands. (*Rec. Ind. Mus.*, XXVII, pp. 205-209 May 1925.) [Many already described species recorded.]

Myers, J. G.—The Cattle-tick (*Hæmaphysalis bispinosa*). (Investigations during 1923-24, N. Z., Dept. of Agric. Bull. 116, 105, 17 figs., Wellington, N. Z., 1924.) [A detailed account of *Hæmaphysalis bispinosa*.]

N

Napier, L. E.—A Comparative study of the Environment associated with Kala-azar Prevalence in Calcutta. (*Ind. Journ. Med. Res.*, XII, 755-769, 3 maps, 1 pl., Calcutta, April 1925.)

Nath, D.—Attack of Sugarcane-borers and how to reduce them? (*Punjab Agric. Dept. Seasonal Notes*, II, 1-2, Oct. 1925.)

Natvig, L. R.—Fekultativ parasitisme av *Eristalis*-larver hos en ka. (*Norsk Vet. Tidsskr.*, Oslo 1924.) [*R. A. E.*, B., XIII, 58, 1925.]

Navas, L.—Notes sobre Embiópteros. (*Acad. Cien. de Zaragoza*, 1923.) [Description in Latin of—*Embía ramosa*, *E. samaceni*, *E. wagneri*, *Haplæmbia collaris*, *H. clypeata*, *H. bourgi*, *Oligotena sulcata* figs.]

Nechesles, H.—Zur Sinnesphysiologie von *Anopheles*. (*Arch. Schiffsu. Trop. Hyg.*, XXIX, 288-291, Leipzig, June 1925.)

Nelson, J. A.—Morphology of the Honeybee Larva. (*Jl. Agric. Res.*, XXVIII, 1167-1213, 8 pl., June 1924.)

Newstead, R.—A Guide to the study of Tsetse Flies. (Liverpool: The University Press, Ltd., 1925.)

- Newstead, R., Evans, A.M., and Potts, W. H.**—Report on the Investigation into the Destruction of vermin by Hydrogen Cyanide, with especial reference to bed bugs. (*Ann. Trop. Med. and Parasit.*, XIX, 91-118, 6 figs., 1 pl., 1925.)
- Newstead, R. and Potts, W. H.**—Some Characteristics of the First Stage Larva of *Dermatobia hominis* Gmelin. (*Ann. Trop. Med. Parasit.*, XIX, 247-250, 2 pl., 1925.)
- Nicholson, C.**—Növel method of collecting. (*The Ent. Record*, 58-59, 1925).
- Nicholson, J. W.**—
Utilisation Notes from Bihar and Orissa. (*Ind. Forester*, LI, 81-83, Feb. 1925.) [Profits from lac cultivation.]
Some notes on Lac cultivation. (*Ind. Forester*, LI, 483-498, 553-564, 605-614, Oct., Nov., Dec. 1925.)
- Nicolle, Ch., et Anderson, Ch.**—
Recherches expérimentales sur le mode de transmission du Kala Azar. (*Arch. Inst. Pasteur Tunis*, XIV, 264-277, Juillet 1925.)
L'immunité dans le Kala Azar expérimental du chien, avec quelques données sur l'évolution de la maladie chez cet animal. (*Arch. Inst. Pasteur Tunis*, XIV, 278-287, Juillet, 1925.)
- Noguchi, H.**—Yellow Fever Research, 1918-24. A summary. (*Journ. Trop. Med. and Hyg.*, XXVIII, 185-193, May 1925). [*Leptospira icteroides*—the casual agent.]

O

- Ochs, G.**—Description of new Asiatic Gyrinidae. (*Rec. Ind. Mus.*, XXVII, 193-204, May 1925). [New species and sub-species:—*Orectochilus fruhstorferi*, Reg. sub-sp. *intermedius*, Sukli, east side of Dwana Hills; *Orectochilus desgodinsi* Reg. sub-sp. *assamensis*, Sikkim, Pedong; Darjeeling Dist.; Kalimpong, Mongpoo, Sureil; Bihar, Buxar; *O. coimbatorensis*, S. India, Tinnevely hills; *O. cameroni*, West Himalayas, Dehra Dun, Kaligad; *O. parkeri*, West Himalayas, Almora, U. P. Ganai, 5,600 ft.; *O. cavernicola*, Assam, Garo Hills, Siju-cave; *O. choprae*, Assam, Garo Hills, Siju-cave; *O. melli*, China, Kuang-tung

Ochs, G.—*contd.*

province, Tsha-jiu-san hill tracts; *O. kempi*, Yembung, 1,100 ft.; *O. neglectus*, Base of West Himalayas, Naini Tal District, Bareilly; *O. gravelyi*, Chota Nagpur, Chaibassa River; *O. scalaris* Reg. sub-sp. *andamanarum*, Andaman Islands; sub-sp. *parvulus*, Lower Burma, Amherst Dist., Kawkaeik; *O. fletcheri*, South Malabar, Kollengode; *O. marginipennis*, Aube. sub-sp. *angustilimbus*, Dehra Dun, U. P. West Himalayas, Lachiwala; Sub-sp. *parvilimbus*, China, Canton Province, Tsha-jiu-san; *O. cylindricus* Reg., Pusa (Bihar); *O. coronatus*, N. E. Assam, Sadiya, Dikrang River; *O. annandalei*, South India, Travancore, West side of Western Ghats, Tenmalai.]

P

Paillot, A.—La Lyda du Pêcher. (*Ann. Epiphyties*, X, 147-237, 56 figs., 9 pl. 1924.) [A very complete study of *Neurotona nemoralis* and its control.]

Parafentjer, T. A.—On the methods of Destruction of mosquitoes (*Jl. Eco. Ent.*, XVIII, 839-840, Dec. 1925.)

Parker, H. L.—Recherches sur les formes post-embryonnaires des chalcidiens. (*Ann. Soc. Entom. France*, XCIII, 261-379, tt. 2-39, 1924.)

Parker, T.—Tetrachlorethane. Its Use in Horticulture as a Fumigant for White Fly. (*Hortic. Trades Journ.* [reprint,] 1p., Ma. 1925.)

Parnell, F. R.—The Breeding of Jassid Resistant Cotton.—Report of the season, 1924-25. (*The Empire Cotton Growing Review*, II, 330-336, Oct. 1925.)

Patton, W. S.—

Diptera of Medical and Veterinary Importance. I. Types of older Authors in Continental Museums. (*Phil. Journ. Sci.*, XXVII, 177-200, June 1925.)

Diptera of Medical and Veterinary Importance II. (*Phil. Jl. Sci.*, XXVII, 397-411, July 1925.)

- Patton, W. S. and MacGill, E.**—Comparative study of the Antennae of some of the higher Diptera. (*Ind. Journ., Med. Res.*, 275-278, tt. 7-13, 1925.)
- Patwardhan, K. N.**
My experience in Lac-Cultivation in Sangli State Forests near Belgaum. (*Poona Agric. Coll. Magz.*, XVII, 147-149, Dec. 1925.)
- Pemberton, C. E.**—
The Rat Control Problem. (*Rept. Comm. Expt. Sta. Hawaiian Sugar Planters' Assoc.*, 1924, 25-26, 1925.)
The Field Rat in Hawaii and its Control. (*Hawaiian Sugar Planters' Assoc. Expt. Sta. Ent. Ser. Bull.* 17, June 1925).
- Perkins, M.**—On *Acanthophthirius etheldredae*, a new Genus and Species of Anoplura from the Pipistrelle Bat. (*Ann. Mag. Nat. Hist.*, XVI, 175-178, t. 13, July 1925.) [Only louse yet found on bat.]
- Petch, T.**—Entomogenous Fungi and their Use in controlling Insect Pests. (*Ceylon, Dept. Agric. Bull.*, 71, 40, 2 pls. Jan. 1925.)
- Petrochi, J.**—Descripción de un nuevo *Anopheles*. (*Rev. Inst. Ent.*, IV, 69-75, 5 figs. Buenos Aires, Mar. 1925.) [*A. bachmanni*, n. sp., Argentina.]
- Philpott, A.**—On the Wing coupling Apparatus of the Hapialidae. (*Trans. Ent. Soc.*, London, 1925, pp. 331-340, with 5 figs.)
- Pierce, W. D.**—
Insects that affect the cotton plant. (*Cotton News Weekly*, II, 169, 1925.)
The History of the Rynchophorid genera *Rynchophorus*, *Calendia*, *Sphenophorus* and *Sitophelus* (Coleoptera). (*Proc. Ent. Soc. Wash.*, Vol. 27, 5, pp. 113-116, May 1925.)
- Plavilstshikov, N. N.**—Contribution à l'Etude des Espèces Eurasiennes de Genre *Gaurotes*, J. Lec. (Coleoptera, Cerambycidae). (*Ann. Mag. Nat. Hist.* XVI, 323-332, Sep. 1925.) [Keys.]
- Post, G. B.**—Boll Weevil Control by Airplane. (*Georgia State Coll., Agric.*, XIII, Bull., 301, 22 pp., 8 figs. Nov. 1924.)

- Poulton, E.B.**—The detailed resemblance of an Indian Lepidopterous larva to the excrement of a Bird. (*Proc. Ent. Soc., Lond.*, 1924, pp. XC-XCI; Feb. 1925.)
- Poutiers, R.**—L'état actuel de la lutte contre la Fourmi d'Argentine (*Iridomyrmex humilis* Mayr.) en France. (*Ann. Epiphyties*, XI, 301-311, figs. July-Aug. 1925.)
- Priesner, H.**—Katalog der europäischen Thysanopteren. (*Konowia*, 141-159, July 1925.)
- Prout, Louis B.**—Geometrid Descriptions and Notes. (*Nov. Zoo.*, XXXII, 31-69, April 1925.) [Sub-fam. Larentiinae: *Xanthorhæ hamptoni*, n. sp., Simla, Dalhousie, p. 39; *X. placida*, n. sp., Bhutan, Buxa, Sikkim, Naga Hills, N. E. Burma, Htaungaw, 6,000 ft., p. 40; *Antimimistis subteracta*, n. sp., N. India: Khasia Hills, Darjeeling, pp. 42-43; *Phthonoleba auxostira*, n. sp., S. & C. India: Madura dist., Peermad, Travancore, Nilgiris, Shevaroy Hills, Cuddapah, Gooty, p. 43. Sub-fam. Geometrinae: *Abraxas prosthetocneca*, n. sp., S. India: Madura dist., Palni Hills, Peermad, Travancore, p. 47; *Epifidonia absona pyrsea*, n. sub. sp., Assam: Naga Hills, 5,000-8,000 ft., Burma: Kabru, p. 53; *Elphos nimia* n. sp., N. India: Sikkim, Bhutan, Khasis, p. 54; *Medasina oblivia* n. sp., Assam: Shillong, p. 55; *Hemerophila subterminalis*, n. sp., N. India: Khasis, Darjeeling, p. 56; *Bourmia glochinophora*, n. sp., Khasis, p. 58; *Luziaria emphatica*, n. sp., Assam: Khasis; Nagas, p. 63; *L. mitorrhaphes*, n. sp., Sikkim, Bhutan, Assam, Burma, W. China, Formosa, p. 64; *Nadagara orbipuncta*, n. sp., N. W. India: Dalhousie, p. 64-65; *Scardamia seninigra*, n. sp., N. India: Sikkim, Bhutan, Khasis, p. 66; *Corymica spatiosa*, n. sp., N. India: Darjeeling, Khasis, p. 66 and 67; *Synegia medionubis*, n. sp., Assam: Naga Hills, Cherrapunji, p. 68. Many already described spp.]

Pruthi, H. Singh—

- The development of the male genitalia of Homoptera, with preliminary remarks on the nature of these organs in other insects. (*Q. J. M. S.*, LIX, 59-96, Dec. 1924.)
- The Morphology of the Male Genitalia in Rhynchota. (*Trans. Ent. Soc. London*, 127-267, XXXII, pl. 1925.)
- Homologies of the genital ducts of insects. (*Nature*, CXV, 763, May 1925.)

Pruthi, H. Singh—contd.

Studies on insect metamorphosis, III. Influence of starvation.
(*Br. Journ., Exp. Biology*, III, 1-8, 1925.)

Recherches sur la metamorphose des insectes. Influence des traumatismes. (*Comptes Rendus d. Séances. Soc. Biologie, Paris*, XCVI, 76-77).

Moulting of Insects. (*Nature*, CXVI, 938, Dec. 1925.)

Puri, I. M.—On the Life-history and structure of the Early stages of Simuliida (Diptera, Nematocera). (*Parasitology*, XVII, Pt. I, 294-334, pls. 8-11, 6 fig. Pt. II, 335-369, figs. Aug.-Oct. 1925.)

R**Ramachandra Rao, Y.—**

A short note on the habits and food plants of some of the Indian species of *Atherigona* described by Mr. Malloch. (*Mém. Dept., Agric. Ent. Ser.*, 123-125, April 1925.)

A New Pest of Pepper. (*Madras Agric. Dept. Year Book* 1924, 21-23, 1925.)

Ramakrishna Ayyar, T. V.—

Notes on the status of some Parasitic Hymenoptera in South India. (*Journ., Bombay, N. H. Soc.*, XXX, 487-491, pt. 1-3; Jan. 1925.)

An undescribed Coccinellid Beetle of economic importance. (*Jl. Bomb. N. H. Soc.*, XXX, 491-92, tab. Jan. 1925.) [*Scymnus coccivora*, n. sp., predaceous on *Pulvinaria maxima*, Green; Coimbatore.]

The Nim Mealy Scale (*Pulvinaria maxima*, Green). (*Mém. Dept. Agric. India, Ent. Ser.*, VIII, 127-135, 5 pls., 14 figs., April 1925.)

A Check-List of Indo-Ceylonese Chalcid flies (Chalcidoidea). (*Spolia Zeylanica*, XIII, 235-254, July 1925.)

"Thrips" an insect group little known in India. (*Journ. Mad. Agric., Students Union*, XIII, 312-17, figs., Oct. 1925.)

Some Biological Methods of Insect Pest Control. (*Journ. Mad. Agric. Students' Union*, 1-8, Nov. 1925.)

Two New Thysanoptera from South-India. (*Jl. Bomb. Nat. Hist. Soc.*, XXX, 788-792, figs. Dec. 1925.) [*Kluchthrips subramanii*, n. sp., 788-790, *Lecauwenia karnigi*, n. sp. Bangalore, 791-792.]

An annotated list of the Thysanoptera known from India and Ceylon. (*Jl. Bomb. Nat. Hist. Soc.*, XXX, 861-871, Dec. 1925.) [Key 862-864.]

- Rebouillon.**—Sur la sélection macroscopique et microscopique des paillons de vers à soie du mûrier (*Sericaria mori*) atteints de la maladie de la "grasserie." (*C. R. Acad., Agric. France*, XI, 744-748, 1925.)
- Reh, L. & others.**—Sorauer : Handbuch der Pflanzenkrankheiten. Bd. IV, Tierische Schädlingen an Nutzpflanzen. Erster Teil. (Sorauer, Text-book of Plant Diseases, Vol. IV, Animal Pests of Economic Plants, Pt. I, xvi, 483 pp., 218 figs. Paul Parey, 1925.)
- Reichensperger, A.**—Weitere Histeriden-Beiträge. (*Ent. Mitteilungen*, XIV, 351-357 t. 2, Oct. 1925.) [Arten aus indischen Termitenbauten, p. 354-357; *Paratropus orbicularis* Olliff (?), Bombay: Khandala and Bandora, *P. assmuthi*, n. sp., t. 2, Bombay, Khandala, p. 355-356; *P. planiceps*, n. sp., Bombay, Khandala; from *Odontotermes obesus* Ramb. var. p. 356-357.]
- Reith, F.**—Die Entwicklung des Musca-Eies, nach Ausschaltung verschiedener Eibereiche. (*Zeit. Wiss. Zoo.*, CXXVI, 181-238, 39 figs., Sept. 1925.)
- Reynolds, D.**—Disinfestation of Rooms by Formalin vapour. (*Jl. R. A. M. C.*, XIV, 48-51, July 1925.)
- Rice, C. E.**—Destruction of Cockroaches and Devitalization of their eggs by Cyanogen Chloride Mixture. (*Public Health Repts.*, Washington D.C., XI, 1808-1811, Aug. 1925.)
- Richardson, C. H.**—Oviposition response of insects. (*U. S. Dept., Agric. Bull.* 1324, 1925.)
- Riley, N. D.**—
Annual address to the Members. (Seasonal variation in Butterflies. (*Proc. S. London Ent. & Nat. Hist. Soc.*, 1924-25, pp. 63-81, pl. 3.)
The species usually referred to the Genus *Cigaritis* Boisd. (Lept. Lycenidæ). (*Nov. Zoo.*, XXXII, 70-95, figs. April 1925.) [*Aphiritis*, n.g., p. 78, few Indian spp. Keys.]
- Riley, N. D. and Gabriel A. G.**—Catalogue of the Type specimens of Lepidoptera, Rhopalocera in the British Museum, Part II, Danaidæ, London, 1925.

Ripley, L. B.—

Experiments with cutworm Baits: Success with Sodium Fluoride, (*Entomology Memoirs*, No. 3, *Dept. of Agric. Union of South Africa*, pp. 5-20, 1925.)

Sodium Fluoride as an insecticide, Its possibilities as a Locust poison. (*Bull. Ent. Res.*, XV, 29-34, Aug. 1924.)

The external morphology and postembryology of noctuid larva. (*Ill. Biol. Mon.*, VIII, 1925.)

Rittershaus, K.—Eine neue Art von Eispengern bei Lamellicornierlarven *Phylloptera horticola* L. und *Anomala aenea*, Deg. (*Zoo. Anz.*, LXII, 31-33, figs., Jan. 1925.)

Rockwood, L. P.—An outbreak of *Agrotis ypsilon* Rott. on overflow land in Western Oregon. (*Jl. Econ. Ent.* XVIII, 717-721, Oct. 1925.) [Control—broadcasting a poisoned bran bait.]

Ross, W. C., and Husain, M.—On the life-history of *Herpetomonas muscae-domesticae*. A preliminary Note. (*Ind. Med. Gaz.*, LIX, 614-615, Dec. 1924.) (Abstr. *R. A. E.*, B XIII 32.)

Rothschild, Lord.—Descriptions of new Forms of *Delias*, with some Notes on Orders. (*Ann. Mag. Nat. Hist.*, (9) XV, 671-677, June 1925.) [*Delias agostina infumata*, Fruhst., Assam; Tennasserum, N. India, p. 671.]

Roubaud, E.—Une Nouvelle espèce de Puce-chique pénétrante, parasite des rats en Chine: *Dermatophilus lagrangei*, n. sp. (*Bull. Soc. Path. Exot.*, XVIII, 399-405, May, 1925.)

Rudolfs, W.—Relation between temperature, humidity and activity of house mosquitoes. (*Jl. New York, Ent. Soc.*, XXXIII, 163-169, Sept 1925.)

S

Sampson, W.—Some New Burmese Platypodidae. (*Ann. Mus. Civico Storia Naturale*, LI, 71-75, 1923-25.) [*Cressetarsus loricatus*, n. sp., Burma, Carin. Ascivii Gheeu, p. 71-72; *Platypus nivalis*, n. sp., Burma, Tenasserim, Thagata, p. 73; *P. incanis*, n. sp., Burma, Tenasserim, Thagata, 73-74; *Diaprus gestroi*, n. sp., Burma; Carin Cheba, p. 72-73.]

- Sanctuary, C. T.**—An Easy Method of eradicating Acarine Disease. (*Bee World*, VII, June 1925.)
- Santschi, F.**—Révision des Myrmecaria d'Afrique. (*Ann. Soc. Ent. Belgique*, LXIV, 133-176, 1924 [June 1925].) [Key to some Indomalayan species.]
- Schaff, B.**—Description d'une nouvelle espèce de *Stylops* (Strepsipt.). (*Bull. Ent. Soc. France*, pp. 139-140, April 1925.) (*Stylops ruthenicus*, n. sp.)
- Schulthess, A.**—Beitrag zur Kenntnis der Gattung *Alastor* Lep. (Hym. Vesp.) (*Konowia* IV, 57-65, Mar. 1925.) [*Alastor (Antulastor) variolosus* Bingham, p. 59, Trincomali.]
- Schultze, W.**—A Monograph of the Pachyrrhynchid group of Brachyderinae, Curculionidae, Part III. The Genera *Apocryptidius* Heller and *Metapocryptus* Heller. (*Philipp. Journ. Sc.*, XXVI, 131-309, tt. 1-12, Feb. 1925.) [A large number of n. spp., Non-Indien.]
- Scott, H.**—Zoo-geographical and Systematic Notes on the Nycteribidae. (Dip. Pupipara) of India, Ceylon and Burma. (*Rec. Ind. Mus.*, XXVII, 351-384, 32 figs., Sept. 1925.)
- Séguy, E.**—Étude sur quelques Muscides exotiques à larves parasites. (*Bull. Soc. Path. Exotique*, XVIII, 732-735, Nov. 1925.) [Key to some Calliphorine genera.]
- Sen, S. K.**—Insects and their relation to the diseases of man, animals and plants. (*Ind. Med. Gaz.*, 277-79, June 1925.)
- Senior-White, R.**—
A revision of the sub-family Rhiniinae in the Oriental Region. (*Rec. Ind. Mus.*, 81-96, tt. 5-6, Mar. 1925.) [Key, 82-83; Key to species of *Pollenia*, 83-84, *Pollenia pilisquama*, n. sp., Sudaganga, Matale Dist., Ceylon; Keys to species of—*Strongyloneura*, 86; *Metailex*, 90; *Idiella*, 92; *Stomohina*, 93.]
The eradication of Malaria from a Rubber Estate (*Ind. Journ. Med. Res.*, XII, 545-551, Feb. 1925.)
Notes on Ceylon Mosquitoes, I. (*Spolia Zeylanica*, XIII, 213-222, pls. 8-9, July 1925.) [Key to larvæ.]

Senior-White R.—contd.

New Ceylon Diptera, Part IV. (*Spolia Zeylanica*, XIII, 209-212, pl. 7, July 1925.) [Tabanidæ: *Hæmatopota ricardenis*, n. sp., Ratnapura dist., Ceylon; Sarcophagidæ: *Sarcophaga talenata*, n. sp., Murunkan, N. P. Ceylon.]

Shah, Abdullah—A Note on "Kutra" (Hairy caterpillars of *Amsacta* spp.) (*Punjab Agric. Dep. Seasonal Notes*, II, 14-16, Oct. 1925.)

Shaw, R. K.—The Destruction of Rat-fleas by heat on Board Ship. (*Journ. R. N. Med. Serv.*, XI, 255-260, Oct. 1925.)

Shortt, H. E., and Swaminath, C. S.—Experiments to decide whether the Bed-bug *Cimex hemiptera*, Fabr. can transmit Indian Kala-azar. (*Ind. Journ. Med. Res.*, XIII 143-147, July 1925.) [*Cimex hemiptera*, Fabr. can not transmit Kala-azar. directly or indirectly by its bite to *Macacus rhesus*, attempt to infect a monkey by the oral route through the faeces of bed-bug fed on case of Kala-azar gave negative results, examination by cultural methods of bed-bugs from Kala-azar locus gave negative results.]

Sicard, Dr.—Descriptions de Coccinellides appartenant à la Collection de M. Andrewes, de Londres. (*Ann. Mag. Nat. Hist.*, (9) XV, 447-449; April 1925.) [*Solanophila erinacea*, n. sp., pp. 447-448, Nilgiris; *Epilachna grayi* var. *zebra*, nov., pp. 448-449, Nilgiris; *Stictobura rubroguttata*, n. sp., p. 449, Nilgiris.]

Sinton, J. A.—

Notes on some Indian species of the genus *Phlebotomus*. Part X. Abnormalities in the Appendages of some specimens of *Phlebotomus*. (*Ind. Journ. Med. Res.*, XII, 467-469, t. 34, Feb. 1925.)

The Indian Rat-fleas, with special reference to the identification of the Plague Fleas. (*Ind. Journ. Med. Res.*, XII, 471-478, tt. 35-36, Feb. 1925.) Key genera of *Pulicidæ*, 472; Distribution in India, 475; technique 475-477.]

Notes on some Indian Species of the Genus *Phlebotomus*. Part XI. The Role of Insects of the Genus *Phlebotomus* as Carriers of Disease, with Special Reference to India. (*Ind. Journ. Med. Res.*, XII, 701-729, April 1925.)

Notes on some Indian Species of the Genus *Phlebotomus*. Part XII. *Phlebotomus argentipes* Annandale and Pratt. 1928. (*Proc.*

Sinton, J. A.—*contd.*

Journ. Med. Res., XII, 789-800, t. 54, April 1925.) [Distribution, description; *P. annandalei*, Sinton=*P. argentipes*, Annandale and Brunetti.]

Notes on some Indian Species of the Genus *Phlebotomus*. Part XIII. Method of collection and preservation. (*Ind. Journ. Med. Res.*, XII, 801-806, April 1925.)

Notes on some Indian Species of the Genus *Phlebotomus*. Part XIV. The Hypopygium of the Female *Phlebotomus*, (*Ind. Journ. Med. Res.*, XIII, 97-108, tt. 2-3, July 1925.)

Sinton, J. A., and Little, C. J. H.—The Occurrence of Culicoides as an Ectoparasite of Anophelines, (*Journ. R.A.M.C.*, XIV, 45-47, July 1925.)

Skaife, S. H.—The Fungous Disease of Locusts. (*Reprint No. 29. Dept. of Agric. Union of South Africa*. 8 pp., 4 figs, 1925.) [*Empusa grylli* is the organism of disease.]

Smith, K. M.—Further experiments in the control of certain maggots attacking the roots of vegetables. (*Ann. App. Bio.*, XII, 77-92, Feb. 1925.)

Smith, R. A. O.—A Note on a Simple Method of Breeding Sandflies. (*Ind. Journ. Med. Res.*, XII, 741-742, 2 pls., April 1925.)

Smyth, E. Graywood.—Why not Trap-crops that Entrap? (*Jl. Eco. Ent.*, XVIII, 550-552, June 1925.) [*Meibomia amans*, Wats. (Leguminosæ) Stems and leaves copiously covered with hooked point fine hairs and insects get entangled in these. Might be useful against Mexican bean beetle. *Melinis minutiflora*, a grass pubescent and sticky. Cattle pastured exclusively in this grass become entirely freed from ticks within a year, because the young "seed" ticks as they attempt to climb up the plant get entangled on the sticky surface. Useful as trap for small insects, hoppers and aphids and might be grown round fields.]

Snodgrass, R. E.—

Anatomy and Physiology of the Honey bee. pp. i-xviii, 1-327, 108 text figs. New York, McGraw-Hill, Book & Co., 1925.

Insect Musicians, their Music, and their Instruments. (*Annual Report of Smithsonian Institution*, 405-452, figs. 1923, published 1925.)

Snyder, T. E.—

Origin of the castes in termites. (*Proc. Biol. Soc. Washington*, XXXVIII, 57-68, 1925.)

Description of Winged adult of *Kaloterms approximatus* Snyder (Isoptera). (*Proc. Ent. Soc. Wash.*, XXVII, 14, Jan. 1925.)

Spaar, E. C.—Some observations on the Common Endemic Fevers of Ceylon. (*Journ. Trop. Med. Hyg.*, XXVIII, 349-352, Oct. 1925.)**Spaeth, F.—**Die Gattung *Prioptera* Hope (Coleoptera, Cassididae). (*Philip. Journ. Sc.*, XXVIII, 379-435, tt. 1-2, Nov. 1925). [Remarks, key spp. 381-384, some Indian spp.]**Sreenivasa Rao, H.—**Further experiences with the Rhinoceros Beetle. (*Journ. Mysore Agric. and Exptl. Union*, VI, 192-193, 1924.)**Srinivasayya, M.—**The Fundamentals of Intensive Lac Production. (*Journ. Sci. Assoc.*, Maharaja's coll. Vizianagram, 1, 133-145. Madras, Jan. 1924.)**Steiner, G.—**Mermithids parasitic in the Tea Bug (*Helopeltis antonii*, Sign.) (*Mededeelingen Praefstation voor Thee*. No. XCIV, 10-16, pl. 1925.)**Storey, H. H.—**Sugar-cane Diseases of the Mosaic Type in South Africa, Part II. (*Jl. Dept. Agric. Union S. Africa*. X, 532-537, 2 figs., 2 pls., June 1925.) [The disease may be transmitted by *Balclutha mbila* Naude.]**Strickland, C.—**

Notes on Malaria in Hill Stations in or near the Eastern Himalayas, (*Ind. Med. Gaz.*, LIX, 549-550, 1 chart, No. 1924.)

On the Larvæ of some Indian *Anopheles*. (*Ind. Journ. Med. Res.*, XII, 561-563, tt. 41-42; Jan. 1925.)

The Mosquito Factor in the malaria of Assam and its Prevention. (*Proc. Assam, Branch, Brit. Med. Assoc. Ann. Meet, Jorhat*, 30-42, Mar. 1925.)

The mosquito Factor in the malaria of Assam Tea Gardens. (*Ind. Med. Gaz.*, LX, 172-179, 1925.)

Sturtevant, A. H.—The Seminal Receptacles and Accessory Glands of the Diptera with special Reference to the Acalyptera. (*Journ. N. Y. Ent. Soc.*, XXXIII, 195-215, Dec. 1925.)

Subramanyam, T. V.—*Coptosoma ostensum*, Dist. and its enemy *Synia melanaria*, Muls. (*Jl. Bom. Nat. Hist. Soc.*, XXX, 924-925, 1 t. Dec. 1925.)

Surcouf, J., et Guyon, L.—Recherches préliminaires sur la morphologie et la biologie des larves d'Estrides (*Bull. Soc. Ent. France*, 68-72, 1925.)

T

T. F. (F. T.)—Cultivation of Lac in the Khasi Hills, Assam. (*Ind. Forester*, LI, 614-615, Dec. 1925.)

Takahashi, R.—

Aphididæ of Formosa, Pts. 3 and 4. (*Formosa Department of Agriculture, Govt. Research Institute Reports Nos. 10 and 16*, Taihoku, July 1924 and July 1925.) [Parasites of aphids. Some Indian species.]

Tattersfield, F., Gimingham, C. T. and Morris, H. M.—

Studies on Contact Insecticides. Part I. Introduction and Methods. Part II, A Quantitative examination of the Toxicity of *Tephrosia vogelii*, Hook, to *Aphis rumicis*, L. (the Bean Aphis). (*Ann. App. Biol.*, XII, 61-76, 3 graphs., Feb. 1925.)

Studies on Contact Insecticides Part III. A quantitative examination of the Insecticidal action of the Chlor-Nitro and Hydroxyl derivatives of Benzene and Napthalene. (*Ann. App. Biol.*, XII, 218-262, 12 diagr., 6 tables, May 1925.)

Taylor, H. S.—The Khapra Beetle: its influence on the moisture content of Malt in store. (*Bull. Bur. Bio-Technol.*, II, No. 13, pp. 113-117; Leeds, Dec. 1924) (*Abstr. Rev. Appl. Entom.* XIII, A. 90-91).

Templeton, J.—

The effects of Heat Treatment of Cotton seed on its germination and on the subsequent growth and development of the plants. (*Egypt Agric. Tech. Bull.* 48, pp. 9, tabs. 3, 1924.)

Templeton, J.—*contd.*

Ratoon cotton in Egypt. (*Minist. Agric. Egypt, Tech. and Sci. Serv. Bull.* 55, 14, 1925.)

Thakar, B. J.—Stored Grain Pests in Gujrat. (*Poona Agric. Coll. Magz.*, XVII, 131-139, Dec. 1925.)

Thatcher, R. W., and Streeter, L. R.—Chemical studies of the combined Lead Arsenate and Lime-Sulphur Spray. (*New York Agr. Expt. Sta. Bull.* No. 521, Geneva, Aug. 1924.)

Thompson, A. G. G.—Barley Itch. (*Brit. Med. Journ.*, No. 3341, 71, Jan. 1925.)

Thompson, B. G.—The Symphilid, an injurious garden pest in Oregon. (*Jl. Eco. Ent.*, XVIII, 716, Oct. 1925.)

Timberlake, P. H.—

Notes on Hawaiian Aphide, with a list of food plants (Homoptera.) (*Proc. Hawaiian Ent. Soc.*, for 1923, V, 450-460, Dec. 1924.)

Records of the Introduced and Immigrant Chalcid-Flies of the Hawaiian Islands (Hymenoptera). (*Proc. Hawaiian Ent. Soc.*, for 1923, V, 418-449, Dec. 1924.)

Tiwari, C. D., and Lal, R. B.—A note on the efficacy of *Necm-battis* in the destruction of rats and rat-fleas in rat burrows. (*Ind. Med. Gaz.*, LX, 310-311, 1925.) [Fumigation with *necm-batties* kills rats and fleas in 5 minutes.]

Tokuda, Y., and Sumita, E.—Studies on Poisonous Honey in Japan. I. On the Sources of Poisonous honey. (*Jap. J. Zootechn. Science*, I, No. 3, 103-120.) [Summary in English.]

Tonnoir, A. L.—Australasian Simuliidæ. (*Bull. Ent. Res.*, XV, 213-55, figs, Jan. 1925.)

de la Torre-Bueno, J. R.—

On some Aquatic Hemiptera from Ceylon, with description of New Forms. (*Spolia Zeylanica*, XIII, 223-234, July 1925.) [Key to British India Genera of Gerrinæ, p. 226-227, Key to Indian species of the Genus *Microvelia* Westwood, p. 229-230, *M. longicornis* n. sp., p. 231.]

de la Torre-Bueno, J. R.—*contd.*

Methods of collecting, mounting and preserving Hemiptera. (*Cand. Ent.*, LVII, 6-10, 27-32, 53-56, 1925.)

Trimble, H. E.—A Vacuum-Cyanide Method of delousing clothing and baggage. (*Pub. Health Repts.*, Washington, D. C. XI, 335-351, 3 pls., 1925.)

Trouvelot, B.—Cage pour la culture de Plantes et l'Élevage d' Insectes au Laboratoire, cage dite "Verticale." (*Ann. Epiphyties*, X, 255-260, pl. I, II, 1925.)

Turner, C. L.—A mutation in the moth-like fly (*Psychoda aternata*) and the method of its transmission. (*Bio. Bull.*, XLVIII, 128-138, Feb. 1925.)

Twinn, C. R.—Observation on the Host-Selection Habits of *Pieris rapæ* L. (*55th Annual Rept. Ent. Soc. Ontario*, 1924, 75-80, 1925.)

U**Uvarov, B. P.**—

A revision of the genus *Ceracris* Walk. (Orthopt. Acrid.) (*Ent. Mitteilungen*, XIV, 11-17, Jan. 1925.) [Gen. discussion; Key to spp.; *Ceracris striata*, n. sp., N. W. F. Province, Abbottabad, p. 16.]

Notes on the Orthoptera in the British Museum. 4. Identifications of types of Acrididæ preserved in the Museum. (*Trans. Ent. Soc. London*, 1924, 265-301, Feb. 1925.)

Acrididæ. (Mission Guy Babault dans les Provinces centrales de l'Inde et dans la région occidentale de l'Himalaya, 1914, Sep. pag., pp. 7-43, col. tab. Paris, 1925.)

Grasshoppers (Orthoptera, Acrididæ) from the Mount Everest. (*Ann. Mag. Nat. Hist.*, XVI, 165-173, t. 11, July 1925.) [Subfam. Acrydiinæ: *Hyballa tibetana*, sp. n., Rongshar valley and Tropde, 11,000 ft.; *Omocestus hingstoni*, sp. n., Tropde 11,000 ft.; *Dysanema*, n.g., *D. irvinei*, sp. n., Tinki-Dzong, 15,000 ft., Lingka, 14,000 ft., Kampa-Dzong, 15,000 ft., Phari, 14,000 ft.; *D. malloryi*, sp. n., Phari, 16,000 ft.]

A new grasshopper injurious to rice in Siam. (*Bull. Ent. Res.*, XVI, 159-161, figs. Oct. 1925.) [*Quilta oryza* sp. n., Klong Rang Sit, Bangkok, Siam.]

Uvarov, B. P.—*contd.*

Orthoptera (except Blattidæ) collected by Prof. Gregory's expedition to Yunnan. (*Journ. & Proceed. Asiatic Soc. Bengal, N.S. XX*, 313-335, 8 t. 6g. (1924) 1925.)

V

Vayssière, P., et Mimeur, J.—Sur quelques Insectes nuisibles au Cotonnier en Afrique Occidentale Française. (*Agronomie Coloniale*, XIII, 89-125, tt. 1-7, Sep. 1925.)

Verity, R.—Remarks on the Evolution of *Zygæna* and an attempt to analyse and classify the variations of *Z. lonicera*, Scheven, and of *Z. trifillii* Esp. and other sub-species. (*Ent. Record*, XXXVII, 101-104, 118-121, 135-138, 154-158, Pl. VIII, Sept., Oct., Nov. 1925.) [endocrine secretion and variation.]

Verlaine, L.—

L'instinct et l'intelligence chez les Hyménoptères.—I. Le problème du retour au nid et de la reconnaissance du nid (*Vespa vulgaris* L., *Bombus lapidarius* et *B. hortorum*). (*Mémoires publiés par l'Acad. Roy de Belgique [classes de sciences]*, VIII, 1924.)

II. L'instinct de nidification chez le *Peloxæus clypeatus* Kohl. du Congo belge. (*Ann. Soc. Ent. Belgique*, LXIV, 198-237, 1924 (June 1925).)

III. Le reconnaissance du nid et l'éducabilité de l'odorat chez la *Vespa germanica* F. (*Ann. Soc. Roy. Zool. Belgique*, LV, 1925).

IV. L'variabilité de l'instinct chez le *Pompilus viaticus* L. (*Bull. Ann. Soc. Ent. Belgique*, LXV, 251-259, Aug. 1925.)

Sur la précarité des caractères distinctifs des *Vespa vulgaris* L. et *germanica* F. (*Bull. Ann. Soc. Ent. Belgique*, LXV, 315-347, Dec. 1925.)

Viereck, H. L.—Some synonymy in the Ichneumonidae. (*Canad. Ent.*, LVII, 104, 1925.)

Visher, S. S.—Tropical cyclones from an ecological viewpoint. (*Ecology*, VI, 117-122.)

Voelkel, H.—Ueber die praktische Bedeutung der Schlupfwespe *Trichogramma evanescens*, Westw. (Arb. Biol. Reichsanst. Land-u. Forstw., XIV, 97-100, 2 figs. Aug. 1925.)

Vogel, R.—Bemerkungen zum weiblichen Geschlechtsapparat der Küchenschabe. (*Periplaneta orientalis* L.) (Zoo. Anz., LXIV, 56-62, 2 figs. Sept. 1925.)

Voss, E.—

Die Unterfamilien ATTELABINÆ und APODERINÆ (Col. Curc.) 18 Beitrag zur Kenntnis der Curculioniden. (Stett. Entom. Zeit., LXXXV, 1-70, 191-304, 1924, published, 1925.) [Keye, morphology, sexual dimorphism, biology and phylogeny and maps of geo. distribution; numerous species the following are Indian:—*Trachelolabus whitei*, India, 212; Genus *Paramecolabus*, 219, Key, spp. 219, *Catalabus*, n. sub-g., *Paramecolabus pallidipennis*, n. sp., Sikkim, 220; *P. simulatus* (*Attelabus simulatus*, Marshall), Himalayas, Khasia Hills, Sikkim, Darjeeling, 221; *P. lacertosus* (*A. lacertosus*, Marshall), Himalayas, 222; *P. feae* Faust, Burma, 222-223; *P. discolor* (*A. discolor*, Fabr.) Siam, Belgaum, Madras, 223; *P. obliquus* (*A. obliquus*, Heller), Borneo, Sarawak, 224; *Henicolabus*, n. gen. 224; Key spp. 225; *Allolabus*, n. sub-g. 229, *H. fausti*, n. n. (*Attelabus humerosus*, Faust.) Burma, Carin Cheba 226; *H. brachmanus*, n. sp., Java, 229; sub-g. *Henicolabus* sens. str. 229; *H. uniformis* (*A. uniformis*, Heller.) Borneo, Sumatra, Malacca, 229-230; *H. octospilctus* (*A. octospilctus*, Jekel) Ceylon, India, Belgaum, 232; *H. octomaculatus* (*A. octomaculatus*) Pondicherry, 232; Genus *Lamprolabus*, 232; Key to spp. 233, sub-gen. *Lamprolabus* sens. str.; *L. hispinosus* (*A. hispinosus* Gyllenhal) Java, Sumatra, Borneo, Malacca, 234; *L. dajacus* (*A. dajacus*, Heller) Borneo, Sumatra, 234-235; *L. trapezicollis* (*A. trapezicollis*, Heller) Burma, Carin Cheba, 1100, 236; *L. spiculatus* (*A. spiculatus* Boheman) Assam, Saharanpur, 236; *Enoploolabus*, n. sub-g. 237; *L. gestroi* (*A. gestroi*, Faust) Burma; Carin Cheba. 900-1100, 237-238; *L. malaccensis* (*A. malaccensis* Heller), Malacca, Sumatra, 238; *L. sandakanus* (*A. sandakanus* Heller) Borneo, 239; Tribe: Euprosini, 291; distribution map. 292.]

Kritische Bemerkungen zum Genus *Eugnathus* Sch. und Verwandte, eine Bestimmungstabelle und Beschreibung neuer Arten. (Col. Curc.) (Deutsch. Ent. Zeitschr., 210-223, Aug. 1925.) (Key to spp., 213-215; *Eu. khasianus* Fst., India, Sikkim, Darjeeling, Khasia Hills, Belgaum, Farway.]

LIST OF PUBLICATIONS ON INDIAN ENTOMOLOGY

Voukassovitch, P.—

Contribution à l'étude d'un Champignon Entomophyte. (*Spicaria farinosa*, Fries, var. *verticilloides*, Fron.) (*Annales des Epiphytes*, XI, 73-106, Mar. and April 1925.)

Observations biologiques sur quelques insectes prédateurs des Pucerons et leurs parasites et hyperparasites. (*Bull. Soc. Ent. France*, No. 10, 170-171, Mai 1925.)

W

W..... C.—Modern Entomology (*Nature*, CXVI, 163-164, 1925.)

Wagle, P. V.—Land Crabs as Agricultural Pests in Western India. (*Bombay Dept. of Agric. Bull.* No. 118 of 1924, Poona, 1924.)

Watkins, H. T. G.—

The Ceylon races of *Terias blanda* Bdr., and *Sari*, Horsf. (*Journ. Bombay, N. H. Soc.* XXX, 711, June 1925.) [Proposes to rename *Sari* as *Ormistonii*, nom. nov. and *blanda* as *rotundalis*.]

New *Callerabias* (Lepidoptera, Satyridæ). (*Ann. Mag. Nat. Hist.*, 233-237, Aug. 1925) [*Callerebia cæca*, sp. n., Nepal; *C. watsoni*, sp. n., N. Chin Hills, W. Burma.]

Webster, R. L.—Fumigation with Hydrogen Cyanide for control of Pear Psylla. (*Bull. No. 523*, N. Y. State Agric. Expt. station, Geneva, N. Y., Nov. 1924.)

Wehrle, L. P. and Welch, P. S.—The Occurrence of Mites in the Tracheal System of certain Orthoptera. (*Annals. Ent. Soc. America*, XVIII, 35-41, Mar. 1925.)

Weiss, H. B.—Statistical Method and Entomology. (*Journ. N. Y. Ent. Soc.*, 56, 1925.)

Whitecomb, W. D.—A new Formula for making Lubricating Oil Emulsions. (*Journ. Eco. Ent.*, XVIII, 234-235, Feb. 1925.)

Whitfield, F. G. Sarel—The Relation between the Feeding-habits and the structure of the mouth parts in the Asilidæ (Diptera). (*Proc. Zoo. Soc., London*, 599-638, Pl. I & II, figs. 1-15, July 1925.)

Wiebe, A. H.—Artificial fertilization of aquatic insects. (*Ann. Ent. Soc. America*, XVIII, 45-48, 1925.)

Wilkinson, D. S.—Cotton Boll-worms. Their Life-history and Control. (*Cyprus Agric. Journ.*, XX, 64-66, April 1925.) [*Earias insulana*, *Platyedra* (*Gelechina*) *gossypiella*.]

Willaume, F.—

Les données actuelles sur les végétaux insecticides. (*Ann. Epiphyties*, IX, 431-441, 1923.)

Esquisse d'un plan de sélection rationnelle des produits insecticides et fongicides commerciaux. (*Rv. Path. Veg. Ent. Agric.* XII, 207-224, July-Sep. 1925.)

Contribution à l'étude des Bouillies insecticides à base d'hailes insolubles. (*Rv. Path. Veg. Ent. Agric.* XII, 225-247, July-Sep. 1925.)

Willemsi, C.—Revision der Gattung *Oxya* Serville (Orthop. Acridioidea, Cyrtacanthacrinæ). (*Tijds. voor Ent.*, XXVIII, 1-60, 65 figs., 1925.) [General Literature, etc., Key p. 10-13; *O. universalis*, n. sp., Bombay, Ceylon, Formosa, China, Philippines, Sumatra, Malacca, etc., pp. 21-22; *O. bidentata*, n. sp., N. W. India, Peshawar dist., Taru, pp. 24-25; *O. oryzivora*, n. sp., Godawari dist., Samalkat, pp. 25-26; *O. uvarovi*, n. sp., N. W. India, Punjab, Bengal, Assam, Mauritius, pp. 27-29; *O. tridentata*, n. sp., Ceylon, Malabar, pp. 30-31; *O. asinensis*, n. sp., Malabar, S. India, Ceylon, pp. 32-33; *O. rufostrigata*, n. sp., Adderley, pp. 33-34; *O. insularis*, n. sp., Ceylon, Malacca, pp. 34-36; *O. grandis*, n. sp., Bengal, pp. 36-37; *O. siamensis*, n. sp., Siam, pp. 32-38; *O. acuminata*, n. sp., Malabar, Ceylon, 42-43; *O. multidentata*, n. sp., N.W. F. P. (Peshawar dist.), Bombay (Malabar), Bengal, Malaya, pp. 44-46; *O. ebneri*, n. sp., Calcutta, South Arcot dist., Fusa, Singapore, pp. 46-47; *O. parvicornis*, n. sp., Hiterindien, pp. 55-57; Geographical distribution: pp. 59-60; many other spp. with complete geographical distributions.]

Williams, C. B. & Bishara, I. E.—The Survival of Pink Boll worm larvae in buried seed during the winter in Egypt. (*Egypt. Minist. Agric. Tech. & Sci., Service, Bull.* 58, 2 pls. 1925.)

Williams, F. X.—A Prothetelous larva of *Monocrepidius eazul*, (Elateridae, Coleoptera). (*Proc. Hawaiian Ent. Soc.*, 1924, 211-212, 1925.) [Bibliography.]

Wilson, C. C.—An Improved Insect Net (*Journ. Econ. Ent.*, XVIII, 546-547, June 1925.) [Description & fig.]

Withycombe, C. L.—

Some Aspects of the Biology and Morphology of the Neuroptera. (*Trans. Ent. Soc., London*, 1924, pp. 303-411, tt. 39-44, 2 figs., Feb. 1925.)

A Contribution towards a Monograph of the Indian Coniopterygidae (Neuroptera). (*Mem. Dept. Agric. India, Ent. Series*, IX, 1-19, tt. i-iv; June 1925.) [Key to Indian genera, pp. 5-6; *Niphadicerca*, n. gen., genotype *Malocomyza terminalis*, Banks, desc., pp. 7-9; *Coniscompsa indica*, n. sp., Pusa, p. 9; *Concentria inverta*, n. sp., Pusa, p. 10; *Nimboa basipunctata*, n. sp., Pusa, pp. 10-11; *Nimboa immaculata*, n. sp., Hoshiarpur, Punjab, pp. 11-12; *Coniopteryx exigua*, n. sp., Pusa, pp. 12-13; *C. ambigua*, n. sp., Nilgiris, Dehra Dun, Shillong, p. 13; *C. obtusa*, n. sp., Pusa, pp. 13-14; *C. pusana*, n. sp., Pusa, 14-15; *C. cerata*, Hagen, Ceylon, p. 15-16; *Semidalis fletcheri*, n. sp., Nilgiris, 6,800 ft., Coonoor, p. 16-17; *S. alpina*, n. sp., ulmurg (Kashmir), 17. Abbottabad, Simla, Dehra Dun, Ramgarh, etc., pp. 17-18; *S. piniciaria*, n. sp., Pusa, pp. 18-19.]

Woglum, R. S.—Observations on Insects Developing Immunity to Insecticides. (*Journ. Eco. Ent.*, XVIII, 593-597, Aug. 1925.) [Red scale and black scale have developed immunity against hydrocyanic acid gas in certain parts of California.]

Wolcott, G. N.—The comparative resistance of woods to the attack of the Termite, *Cryptotermes brevis*, Wlk. (*Puerto Rico Dept. Agric. and Labor, Insular Expt. Sta. Bull.* No. 33, Rio Piedras, Aug. 1924.)

Worral, L.—A Jassid-resistant Cotton. (*Journ. Dept. Agric. Union S. Africa*, X, 487-491, 3 figs. Pretoria, June 1925.) [A Jassid-resistant variety of Indian Cambodia from Coimbatore.]

Wünn, H.—Die Cocciden fauna Badens. (*Zeit. Ange. Entom.*, XI, 427-451, Dec. 1925.) [List of Coccids and their food plants, distribution.]

Y

Yasukawa, S.—The experiments with the Green Muscardine Fungus on some sugar cane Insects. (*Formosa Dept. of Agric. Govt. Res. Institute Report* No. 11, Taihoku, Aug. 1924.)

Yothers, W. W.—

The Use of Calcium Cyanide Dust against *Vespula carolina*, Linn. (*Jl. Econ. Ent.*, XVIII, 368, April 1925.)

Cold Process Oil Emulsions. (*Jl. Eco. Ent.*, XVIII, 545-6, June 1925.)

Yothers, W. W. and **Winston, J. R.**—Preliminary Report on Colloidal clays as Emulsifiers for Mineral Oils used in spraying Citrus Groves. (*Jl. Agric. Res.*, XXXI, 59-65, July 1925.)

SUBJECT INDEX

I. GENERAL.

Treatises and general works.

BERLESE (Text book); CAMERON, A. E. (Soil insects); FLETCHER (Key to orders and families); FORBES (Lep. keys); GREEN (Insect life in Ceylon); HANDLISCH (Text book); HOWARD; IMMS (Text book); KELER (Statistical methods in Ent.); MEYRICK (Microlep. Wegner's hypothesis and distribution); NEWSTEAD (Tsetse flies); REH AND OTHERS (Text book); W. C. (Modern Entomology); WEISS (Statistical methods).

Bibliographical.

Zoological Record 1924; Catalogue of Scientific papers; COLCORD (Index III, Lit. Am. Eco. Ent.); FLETCHER (List. of Pub. on Ind. Ent.); MORSTATT (Pflanzenschutzliteratur 1924).

Technique.

GRAGG (*Cimex*: impregnation); CROSSMAN (Breeding parasites); DUSTAN (Culture of Entomophthorous fungi); HUTCHINSON (Micro-anatomy *Cimex*); NICHOLSON (Collecting); STIXTON (Collection and preservation of sand flies); SMITH (Breeding sand flies); DE LA TORRE-BUERIO (Collecting and preserving Hemiptera); TROUVELOT (Rearing cages); WILSON (Insect nest).

MORPHOLOGY.

General.

BAKER, G. T. B. (Scent sacs); ELTRINGHAM (New organ in Lepid.); FORBES (Lepidoptera Ext. Morph. various stages); GENIPIYS (*Habrobracon baricornis*, Hym.); GRANDI (Fig insects); HOUGH (Internal anatomy, Cecididae); HUTCHINSON (Micro-anatomy, *Cimex*); MEYER (*Pimpla examinator*, Hym.); SNOOKROSS (Honey bee anatomy); SNYDER (winged adult *Kalotermitis approximatus*); VOSS (Curculionidae); WITTHOMBE (Neuroptera, biology and morphology).

Head and mouth parts.

BOCHER (*Psylla* nymph, mouth parts); CRAMPTON (Roach Ext. anat. Labium, Dip.); ELTRINGHAM (Ocelli, Lep.); GLASGOW (4 ocelli in *Melanophus*); MERCIER AND VILLENEUVE (Cyclorhapha Diptera); PATTON AND MACDILL (Antennae Diptera); WHITEFIELD (Mouth parts, Asilidae).

Thorax.

CRAMPTON (Sclerites Diptera, phylogenetic discussion); FEUERBORN (Segmentation); FORBES (Hypothetical wing, Hym.); FULLER (Winged termite); PHILPOTT (Wing coupling, Haplaleidae).

Abdomen.

CRAMPTON (Roach); ELTRINGHAM (Abd. brushes, Abd. glands, Lep.); FORBES (Second abd. pleurite, Coleop.); FULLER (Termite); LEXGERKERN (Coleoptera); LUCAS (Caudal lamellae, Zygoteridae); STIXTON (Hypopygium of *Phlebotomus*).

Digestive system.

EVENUS (*Apis*).

Respiratory system.

CARPENTER (Double stigmata, Orthoptera).

Excretory system.MISSINOLI (Malpighian tubules in *Anopheles claviger* in hibernation).**Glands.**

BAKER, G. T. B. (Scent sacs); ELTRINGHAM (Abd. glands, Sphragidial fluid).

Poison apparatus.

GILMER (Caterpillars); LAFIE (Caterpillars).

Nervous system.

HILTON (Peripheral nervous system).

Reproductive system, genitalia.CRAGO (*Cimex*); EYER (Male genitalia, Lep.); ISAAC (Male genitalia, Tabanidae); PRUTHI (Male genitalia, Homoptera. Development, male genitalia, Rhynchos. Homologies genital duct); STOKREYANF (Seminal receptacles, etc., in Insecta); VOGEL (Periplaneta female sex apparatus).**Egg.**REITH (*Nusca* eggs).**Larvæ.**BROCHER (*Psylla* mouth parts); ELLIS (Ext. characters some Lepidopteron larvæ); EMDEN (Egg-burster, Coleop.); GARDNER (Description of larvæ, Cerambycidae); GILMER (Poison app. of Lepid. larvæ); GORTCHENBUER (Premandibles in *Diptera Nemocera*); GREENE (Sarcophagidae); ISSAC (Head and mouth parts, mechanism of suction, Tab.); DE MEIJER (Agromyzinae); MÖRBERG (Trilobite larvæ); NELSON (Honey bee); NEWSTEAD AND POTTS (Characteristics of 1st stage larvæ of *Serphobea hominis*); PARKER (Chalcidae); PURI (Simuliidae); REITH (Egg-burster); RIPLEY (Ext. morphology and postembryology of noctuid larvæ); RITTERSIALA (Lamellicorn -Egg-burster); STRICKLAND (Indian *Anopheles*); STROCOLY AND GUYON (Morphology and biology, Oestridae); WHITFIELD (Feeding habits and structure, mouth parts, Asilidae).

PHYSIOLOGY.

General and miscellaneous.BODENHEIMER (Temperature, etc., on life-cycles, etc.); BROCHER (Mouth parts of *Psylla*); FUNK (Physiological studies in hibernation); HOWARD (Feeding of parasitic Hym.); MARTINI (Importance of temperature); PRUTHI (Metamorphosis Moulting); SNODGRASS (Honey bee).**Metabolism.**CALDWELL (Desiccation and CO₂ production); COTTE AND TIAN (House fly); LASSON (Food and longevity and fecundity in *Bruchus*).**Sense and nervous system.**AARON (Hearing); ABBOT (Associative memory); BURELL (Vision and flower pollination); LINEBURG (Communication by scent in honey bees); NECKLES (Senses in *Anopheles*).**Sound production.**

BRISTOVE; SNODGROSS.

BODENHEIMER (Importance of temperature. Predicting developmental cycles);
BODINE (Temp. and embryonic development); BROUNT (*Aopheles* eggs, resistance); CARTER (Low temperature on *Bruchus*); GENIUS (Effects on *H. brevicornis*, Hym.); KLOTZ (Salt concentration and larval development mosquitoes); KNIGHT (Temp. and humidity and colour); MACFARLAN (Mosquitoes under winter conditions); MARTINI (Importance of temperature); RUDOLFS (Activity of mosquitoes and temperature and humidity).

KNIGHT (Heteroptera).

BODINE ; GLASER.

Oogenesis and spermatogenesis.

HAYDEN (Coleoptera): MALAN AND MALAN (*Locustana parvulittna*).

WIEBE (Artificial fertilization of aquatic insects).

BRUMPT (Anopheles); FULLER (Grain weevil); RICHARDSON (Oviposition response).

EMDEN (Egg-bursters, Coleop.); BITTERSBAUS (Egg-bursters)

BODINE (Temperature and embryonic development); BRAUER (Bruchus); REITH (Musca).

BODENHEIMER (Temperature and life cycles); KLIGLER (Salt concentration and development of *Anopheles* larvæ); PARKER (Postemphyology of chalcid); PRUTHI (Moulting); RIPLEY (Noctuidæ).

BISCHOFF; DIXEY (*Catopsilia crocale*); PRUTHI (Starvation. Traumatismes).

BRESON (Brenthidae); BISCOFF (*Lipneura*, sp. Dip.); BURNELL (Insect vision and flower fertilization); CAMERON (Mange mite); CHRISTOPHERS AND OTHERS (*Phlebotomus argentipes*); CLARKE AND PERMITS (Termites, feeding habits of castes, etc.); EBER (Orthoptera); ELLIOTT (Cynipidae); FRIEDRICH (*Staphanoderes hampei*); FROST (Leaf mining Coleoptera); FULLER (Eye laying of grain weevil); GENTILE (*Tabrobracon brevicornis*); GRORIE (Root sucking aphids); HASE (*Trichogramma evanescens*); HINGSTON (*Sphex lobatus*); HOWARD (Feeding of parasitic Hymenoptera); ILYNS (*Mucidus scutophagoides*, predaceous larva); ISAAC (Tabinidae, Thripidae); LARSON AND FISHER (*Bruchus quadrimaculatus*); LÉCAILLON (*Colaspidea atrum*); MARTINI (Bionomics and temperature data); MEYER (*Pimpla examinatrix*); PAULOT (*Neurotoma nemoralis*); PURI (Simuliidae); RAMACHANDRA RAO (*Atherigona*); RUDOLFS (House mosquitoes); STEFECU AND GUYON (Ostracides); TWIN (*Pieris* host selection habit); WILKINSON (Life history, cotton bollworm); WITTHOORN (Neuroptera).

Hibernation.

FINE (Leptinotarsa); MCGREGOR (Mosquito under winter conditions); MARCHOCY (*Anopheles maculipennis*); MISSIROLI (Malpighian tubules in hibernating *An. phlees*).

MISCELLANEOUS.**Tropism.**

BUNKER etc. (Mosquito repellents); BUXTON etc. (Attraction of mosquitoes to hay infusions); KO (Colour preference of mosquitoes),

Instinct and intelligence.

BABY (Hym.); TWINN (Host selection in *Pieris*); VERLAINE (Hym.).

Dispersal and migration, etc.

ADKIN (Dispersal of Butterflies and other insects); FELT (Air currents and dispersal); FLETCHER (Migration and pest outbreak); HAYWARD (Migration of butterflies); KENNADY (Distribution of insects of reversed behaviour); MEYRICK (Wegener's hypothesis and distribution of Microlepidoptera); MORSHEAD.

Ecology.

COOK (Climatic conditions and distribution); DODDS (Aquatic insects); FISHER; (Tropical cyclones factors in ecology). [See also under Environmental and Dispersal and Migration.]

Evolution and phylogeny.

CRAMPTON (Diptera); JEFFREY (Polyploidy and origin of species); VERITY (Evolution of Zygaenæ).

Variation.

GLASGOW (4 ocelli in *Melanophus*); KNIGHT (Colour patterns in Heteroptera and temperature and humidity); RILEY (Seasonal variation in butterflies); SINTOS (Abnormality in appendages of *Phlebotomus*); WILLIAMS (Prothetelous larva of Coleoptera).

Mutation.

BREITENBECKER (Apterous *Bruchus*); TURNER (*Psychoda oterata*).

Mimicry and protective resemblance.

ESAKI; MORTENSEN; POULTON.

Regeneration.

GADEAU DE KERVILLE (Antennæ).

Nest.

CHOPRA (*Vespa cinctu*).

Termite life.

CLEVELAND (Feeding habits and intestinal flagellates); SNYDER (Origin of castes).

Bee life.

LINEBURG (Communication by scent).

II. SYSTEMATIC.

II. SYSTEMATIC.

anoplura.

PERKINS (*Acanthophtirius etheldredae*, n. g., n. sp., on bat).

Aphaniptera

DALLA TORRE (Catalogue); JORDAN (n. spp.); ROUBAUD (n. spp.); SINTON (identification).

Isleoptera.

[illegible]

Diptera.

[illegible]

Embioptera.

NAVAS (Descriptions).

Hymenoptera.

menoptera. ALFKEN (*Xylocopa* spp.); BLÜTHGEN (Xomacidae; n. spp.); COCKERELL (Apidae); DOYER (Braconidae; Apidae; Vespidae; n. spp.); EMERY (Formicinae: Genia Insectorum); FAHRINGER (Opuscula braconologica); FELSEH (*All'ars de n. p.*); G. indica; n. spp.); PARASTIC bees, n. spp.); GAUTHIER AND RILL (Haco- nidae); GRANDI (Agaoninae and Sycophaginae; Fig insects); HINXSON (*Sph.*

Hymenoptera—contd.

Isotus) ; KARAWAIEW (Formicidae) ; KIEFFER (Bethylid : n. spp. from Emlidae) ; MAIDL (Muesebeck (*Microbracon* : revision) ; MUKHERJI AND REREIBO (Formicidae) ; RAMAKRISHNA AYYAR (Parasitic Hymenoptera ; Chalcidoideae : check list) ; SANTSCHI (Myrmecaria, Revision) ; SCHULTHESS (*Alastor*. Vesp.) ; VERLAINE (*Vespa vulgaris* and *V. germanica*) ; VIERECK (Ichneumonidae : synonymy).

Isoptera.

SYNDER (*Kaloterms approximatus*, desc.).

Lepidoptera.

BAKER (Liphyrinae : revision ; descriptions) ; BELL (desep., etc.) ; BEESON (Geometridae : n. spp.) ; CORTI (*Agrotis*) ; EVANS, W. H. (Indian Butterflies : identification) ; FLETCHER (Lasiocampidae, Syntomidae, Zygenidae : catalogues) ; FORBES (Keys, etc.) ; HAMPSON (Noctuidae, Hypeninae : n. g., n. spp.) ; DE JOANNIS (Agrotinae : *Pasara* spp. synonymy) ; JORDAN (*Deltia* : n. subspp.) ; ROTHCHILD (*Deltia*, new forms) ; MEYRICK (Exotic Microlepidoptera : n. spp.) ; PROT (Geometridae : n. spp.) ; RILEY (Lycaenidae) ; RILEY AND GABRIEL (Rhopalocera : catalogue of type specimens in B. M.) ; VERITY (Zygenae : evolution, etc.) ; WATKINS (Callerabias, n. spp. ; *Terias blanda*).

Mallophaga.

EWING (Gyropidae : Taxonomy, Biology and Distribution) ;

Neuroptera.

WITHEYCOMBE (Coniopterygidae, n. spp.)

Orthoptera.

CHOPARD (Gryllidae : Ceylon, n. spp.) ; KARNY (Gryllacridae) ; UVAROV (Acrididae Orthop.) ; WILLEMSI (Acridioidea, Cyrtacanthacrinae : Revision).

Odonata.

FRASER (n. spp., etc.) ; LAIDLAW (n. g., and n. spp.) ; LIEFTINK (Zygoptera, Keys, Bibliography).

Psocina.

ENDERLEIN (n. g., and n. spp.).

Rhynchota.

BAKER (Jaseoidae ; Fulgoridae) ; BERGROTH (Coreidae : n. g.) ; CHAMBERLIN (Laciferidae : n. spp., etc.) ; CHINA (Hemiptera : Yunnan, n. spp., etc.) ; ESaki (Hydrometridae) ; FERRIS AND MYERS (D'aspidae : generic types) ; Hall (Egyptian Coccidae, new spp.) ; HOKE (Coccidae : n. spp. with legs) ; HORVATH (Bat bug : n. spp.) ; MORRISON (Orthetinae : keys and desc.) ; TAKAHASHI (Aphididae of Formosa : parasites, etc.) ; TIMBERLAKE (Hawaiian Aphididae : list of food plants) ; DE LA TORRE BUENO (Aquatic Hemiptera of Ceylon) ; WÜNN (Coccidae : list with food plants).

Strepsiptera.

SCHKAFF (*Stylops*, n. spp.).

Thysanoptera.

KARNY (n. spp.) ; PRIESNER (European, Catalogue) ; RAMAKRISHNA AYYAR (n. spp., etc.).

III. APPLIED.

General.

ANONYMOUS (Common names of insects); BALLARD (Report cotton pests); BALLOU (Relationship between crops and pests); BURKILL (Insect vision and flower fertilization); CRIDDLE (Grasshopper outbreak); DOANE (Scientific name of Economic insects); FLETCHER (Importance of Ent. to India. Report. Migration and pest outbreak); FREEBORN (Flies and milk production); HOSE (Biological control of insects); HILSON (Research in cotton entomology); HOARE (Power spraying outfit); HOWARD; HUSAIN (Report); JACOBSON (Plant quarantine and pest control); KUNHI KANNAN (Report); MACKIE (Insect Menace); METCALF (Control measures); MORSTATT (List of common names used in App. Ent.); RAMACHANDRA RAO (Pepper pest); REH, etc. (Handbook of plant diseases, animal pests of economic plants); SEN; SMYTH (Plants as traps). [Reports and reviews.]

Agricultural.

ANDREWS, E. A. (Thrips on tea); ANONYMOUS (*Syngrus rugifrons*, a new cotton pest); AUSTIN (Beetles on cucurbits); BALLARD (Cotton); BALLOU (Cotton); BARBER (Winter mortality and corn borer); CHRALES (Sudan bollworm); COLEMAN (Coffee-borer); FRIEDERICH (Stephanodores); GEORGE (Root Aphids); GRAF (Sweet potato weevil); HAINES (Cotton insects); HILSON (Cotton insect research); HUTSON (Paddy caterpillar and Tea tortrix); JARVIS (Cane insects); JEPSON (Tea shot-hole borer); KUNHI KANNAN (Coffee-borer. Jole Ear-head fly); LÉCAILLON (Lucerne beetles); NATH (Sugarcane borer); PARNELL (Jassid resistant cotton); PREBCK (Cotton insects); POURTIER (Argentine ant); ROCKWOOD (*Agrotis* outbreak); SHAH (*Amsecta*); SMITH (Maggots on roots of vegetables); TEMPLETON (Ratoon cotton and insects); THOMSON (SYMPHYLID as pest); UVANOV (Rice grasshopper); VAYSSIERE AND MIREUR (Cotton insects, Africa); WAGEL (Land crabs); WILKINSON (Cotton bollworms); WILLIAM AND BISHARA (Pink bollworm); WORRAL (Jassid resistant cotton).

Sugarcane mosaic.

ANONYMOUS; ELMER; FAWCETT; HANSFORD; KOFF; STOREY.

Horticultural.

ALI (Citrus psylla); ANONYMOUS (Coffee borer. *Stephanodores*); DANI (Pomegranate caterpillar); DUTT (Giant mealy bug); GURNEY (Control of slaters. Fruit fly control. Grasshopper control); HUSAIN (Mango-hopper); HUTSON (Coconut leaf caterpillar); ISAAC (Coconut slug caterpillar); KUNHI KANNAN (Lime tree borer, Coffee borer, Cardamoms pest); MALLY (Fruit nibbler control); MCCARTHY (Fruit fly poison); PAILLOT (Peach pest); SREENIVASA RAO (Rhinoceros beetle); WEBSTER (Pear psylla).

Forest (trees).

BEESON (*Dihammus cervinus* on teak. Deodar defoliator); BEESON AND CHATTERJI (Sal heart wood borer); CHOUDHURY (*Calopepla leytana* on *Gmelina arborea*); DUTT (Giant mealy bug); FULLER (Termites and timber); MARSHALL (Curculionidae on cultivated trees); RAMAKRISHNA AYYAR (Neem mealy scale); WALCOTT (Termites).

Stored grains.

FULLER (Oviposition of grain weevil); MACKIE, W. W., MASON (Khapra beetle in malting); MIXE (Paradichlorobenzene); TAYLOR (Khapra beetle in malting).

Household.

BISHOP (Fly traps); BUNKER (Mosquito repellants); BUXTON AND HOPKINS (Attraction of *Stegomyia* to hay infusions); CAMERON, J. (Cockroach eradication); COLLET (House fly); GODWIN (Cockroach); HARNED AND ALLEN (Bed bug control); NEWSTEAD (Bed bug control); RICE (Cockroach eradication).

[See also under Medical and Control measures.]

Medical.*Mosquitoes; Ma'laria:*

ANONYMOUS (Anti-malaria advisory Comm. report); BARNES (Oil films and mosquito larvæ); BRUMIT (Resistance of eggs of *A. maculipennis*); BUNKER AND HIRSCHFELDER (Mosquito repellants); BUXTON AND HOPKINS (Attraction of *Stegomyia* to hay infusions); CHARRIER (Oils, etc., and mosquito larvæ); CHRISTOPHERS, GILL (*A. rossii* and malaria); KERANDEL (Insect predators of mosquito larvæ); MARSHALL, J. F. (Mosquito control); PARAFENTJER (Mosquito eradication); SENIOR-WHITE (Eradication of malaria, Ceylon mosquitoes); STRICKLAND (Mosquito and malaria). [See also under Control measures, Bionomics, etc.]

Sand flies; Kala-azar:

CHRISTOPHERS (Kala-azar commission); CHRISTOPHERS, SHORTT AND BARRAUD (Development of parasite. Feeding of Sand flies. Culicoides); CUNNINGHAM AND PUNDIT; LLOYD AND OTHERS (Identification of blood meal of *Ph. argentipes*); MELENKY; MICHAEL; NAPIER; NICOLLE (Experiments in transmission and immunity); SHORTT AND SWAMINATH (*Cimex hemiptera* not carrier of Kala-azar); SINTON (*Phlebotomus*);

Transmission of dangue.

CHANDLER; MEGAW.

M. wellaneous.

ALDER AND THEODOR (Cutaneous Leishmaniasis and *Ph. papatasi*); ANDREWS, H. W. (Flies and disease); EWING (Sulphur-impregnated clothes against chiggers); FRISON (Myiasis and common housefly); HERMS (Myiasis by *Hypoderma bovis*); LAPIE (Poisonous caterpillars); MACKIE (Blood sucking midge); MERAW (Indian tick typhus); MILLS (Insect bite); NOOCUT (Yellow fever); PATTON (Diptera of Med. importance); SINTON (Indian rat fleas); SPEAR (Endemic fevers of Ceylon); THOMSON (Barley itch); TRIMBLE (Vacuum cynde method of delousing). [See also under Mosquitoes, etc., and Household insects.]

Veterinary.

CAMERON (Mange mite); FREERORN AND OTHER (Milk production and flies, etc.); HORTON (*Cystophilus equi* cause of paralysis of oesophagus); KAHAN SINGH; (Surra and tick); LAPIE (Surra in camels); LEHAULLY (Flies and foot and mouth disease); LECKIE (Poisonous caterpillars); MORSON (Maggot and Joint-ill in calves); MYERS (Cattle tick); PATTON (Diptera of Veterinary importance).

CONTROL MEASURES.

General.

ALI (Citrus psylla); ANDREWS (Tea thrips); ANDREWS AND TUNSTALL (Spraying tea); ANONYMOUS (Clothes, moth. Termites. Coffee-borer. Stored grains. Use of airoplanes); BARBER (Importance of winter mortality); BRESOS (Sal heart wood borer); BISHOPP (Fly traps); BUNKER (Mosquito repellants); BUXTON AND HOPKINS (Attraction of mosquitoes); CAMERON (Cockroach); COLEMAN (Coffee borer); COLLET (Flies); CRIDDLE (Grasshopper outbreak); DANI (Pomegranate caterpillars); DRENOWSKI (Hand nets against crickets); DUTT (Bands against mealy bugs); EWING (Sulphur impregnated clothes); FERGUSON (Citrus fumigation); FRIEDERICH (Stephanoderes hamper); FULLER (Termites); GRAF (Sweet potato weevil); GURNEY (Slaters; grasshoppers; fruitflies); HAMILTON AND SMITH (Testing distribution of lead arsenate); HOARE (Power spraying out); HUSAIN (Mango hopper); JACOBSON (Plant quarantine, etc.); JARDINE (Tea Tortrix); JARVIS (Cane insects); JERSON (Shot hole borer); KAMESAN (Wood preservative antiseptics); KING AND JOHNSTON (Dust distributor); MCCARTHY (Fruit fly poison); MACKIE (Stored grain pests); MALLY (Jarring to control fruit nibblers); MANUEL (Spreaders for Bordeaux mixture); MARSHALL (Mosquito control); MELANDER; METCALF; MORSTATT (Bibliography); NATH (Sugar cane

General—*contd.*

bores); PAILOT; PARAFENTJER (Mosquitoes); PARNELL (Jassid resistant cotton); PETCH (Entomogenous fungi and insect control); POST (Aeroplane and boll weevil control); RAMAKRISHNA AYYAR (Biological control); SMITH (Maggot attacking roots of vegetables); SMYTH (Why not Trap crops that entrap?); STRICKLAND (Prevention of mosquitoes in Assam); TIWARI AND LAL (Neem batis against rat and fleas); WILKINSON (Bollworms control); WILLAUME (Vegetable insecticides, etc.); WOOLUM (Insects developing immunity to insecticide s); WORCOTT (Wood and termites); [also under Agricultural, Horticultural, Medical, Household, etc., etc.]

Heat.

ALBERTS AND FLINT (Effect on vitality of seed corn); HARNED AND ALLAN (Bed bug); SHAW (Rat fleas on board ships); TEMPLETON (Cotton seed).

Insecticides, etc. (General).

ANONYMOUS (*Pyrethrum cinerarifolium*); CATHCART AND WILLIS (Analysis of insecticidal material, etc.); CUTLER, etc. (Tobacco cultivation for nicotine); ENGLISH (Use of colloidal clay); FRYER (Principles of Government action); HEADLEE AND RUDOLFS (Nicotine dust); THATCHER AND STREETER (Combined lead arsenate and lime sulphur spray); WOOLUM (Immunity of insecticides).

Contact insecticides.

BARNES (Oil films and mosquitoes); BURROUGHS (Lubricating oils); CHANDLER (Soaps, CHARMIER (Oil and Petrol against mosquito larvæ); EVANS (Oil sprays); FUDER (Oil emulsions); LEACH AND JOHNSON (Wormseed oil and carbon bisulphide against ground insects); LUES (Egg killing washes); TATTERSFIELD AND OTHERS (Contact insecticides); WHITCOMB (Lubricating oil emulsion); YOTHER (Oil emulsion); YOTHER AND WINSTON (Colloidal clay as emulsion).

Stomach insecticides.

CAMERON, J. (Sodium flouride against cockroaches); GURNEY (Slaters; grasshoppers, fruit flies); MARCOWITZ (Non-arsenicals); MCCARTHY (Fruit flies); RIPLEY (Sodium flouride); ROCKWOOD (*Agrotis* and bran bait).

Fumigants.

BACK AND COTTON (Ethyl acetate and carbon tetrachloride); COUTSON (Carbon tetrachloride); FERGUSON (Citrus fumigation); GORE (Calcium cyanide); LAL AND TEWARI (Cresol for house fumigation); MARCHEL AND VAYSIERE; MELANDER (Soil fumigants); MIEGE (Paradichlorobenzene against stored grain insects); NEWSTEAD AND OTHERS (Hydrogen cyanide against bed bug); PARKER (Tetrachlorethane against white fly); REYNOLDS (Formalin vapour); RICE (Cyanogen chloride mixture for cockroaches); TIWARI AND LAL (Neem batis against rats and rat fleas); TRIMBLE (Vacuum cyanide method for delousing clothes); WEBSTER (Hydrogen cyanide); YOTHER (Calcium cyanide dust).

Rat control.

PENBERTON, TIWARI AND LAL (Neem batis).

PARASITES AND PREDATORS OF INSECTS.**Fungi.**

DEUZEIDE (*Beauveria effusa* on *Doryphora*); DUSTAN (Culture methods); KIRKPATRICK (*Rhizopus nigricans* and insect pest of cotton); PETCH (Entomogenous fungi and insect control); SKAIFE (Fungus disease of locust); VOTEKASSOVITCH (*Spicaria farinosa* var.); YASUKAWA (Green Muscardin fungus and sugarcane insects).

Animals other than insects.

ALDER AND THEODOR (A sporozoon of *Ph. papatasi*); CLEVELAND (Termites and intestinal flagellates and other subjects); HOLMES (Herpetomonas in insects and plants); JEGEN (Protozoa of *Stomoxys*); MENZEL (Mermithiden parasite of *Helopeltis*); ROSS AND HUSAIN (Herpetomonas in *Musca domestica*); STEINER (Mermithiden parasite of *Helopeltis*); WEHRLE AND WELCH (Mites in tracheal system of Orthop.).

Insects.

AARON; ALDRICH (Tachinid); ANONYMOUS (n. spp. parasitic insects in 1925); BALACHOWSKY (Predators of coecid *Parlatoria blanchardi*); BEZZI (Tachinid); CROSSMAN (Fly parasites of Gipsy moth); FERRIERE AND FATHÉ (Chalcid parasites of *Apanteles glomeratus*); FRIEDERICH (Parasites of *Stephanoderes hampei*); GABRIELSEN (*Helopeltis*); GENTÉYS (*Habrobracon brevicornis*); HASE (Biological control of insects: *Trichogramma evanescens*); INNS (Predaceous larvae of *Mucida scutophagoides*); KERANDER (Predators of mosquito larvae); KIEFFER (Bethylid parasite of Embiidæ); MENZEL (Parasites of *Helopeltis*); NATVIG (Facultative parasitism of *Eristalis* larva); RAMAKRISHNA AYYAR (Parasitic Hymenoptera, etc.); SEGUY (Muscides with parasite larvae); SINTON AND LITTLE (Culicoides on anophelines); SUBRAMANYAM (*Synia* on *Coplasoma*); TAKAHASHI (Parasites of Aphids); TIMBERLAKE (Chalcids in Hawaii, introduced and immigrants); VOELKEL (Practical importance of *Trichogramma evanescens*); VOUKASSOVITCH (Predators of aphids and their parasites and hyperparasites).

USEFUL INSECTS.**Apiculture.**

GOODACEE (Travelling cage for queen); GRAHAM SMITH (Nomenclature of Queen Bees); SANCTERAY (Acarine disease); TOKUDA AND SUMITA (Poisonous honey).

Lac-culture.

HAUTEFEUILLE, MAHDIHASSAN, NICHOLSON, PATWARDHAN, SRINIVASAYYA.

Sericulture.

FUSCHINI (Control of "Flaccidezza"); HOWARD AND BUSWELL, REBOUILLOU (Grasserie).

MISCELLANEOUS.**Insect weed killers.**

ALEXANDER (Enemies of Prickly Pear and their introduction in Australia).

Pest Act notifications.

ANONYMOUS.

